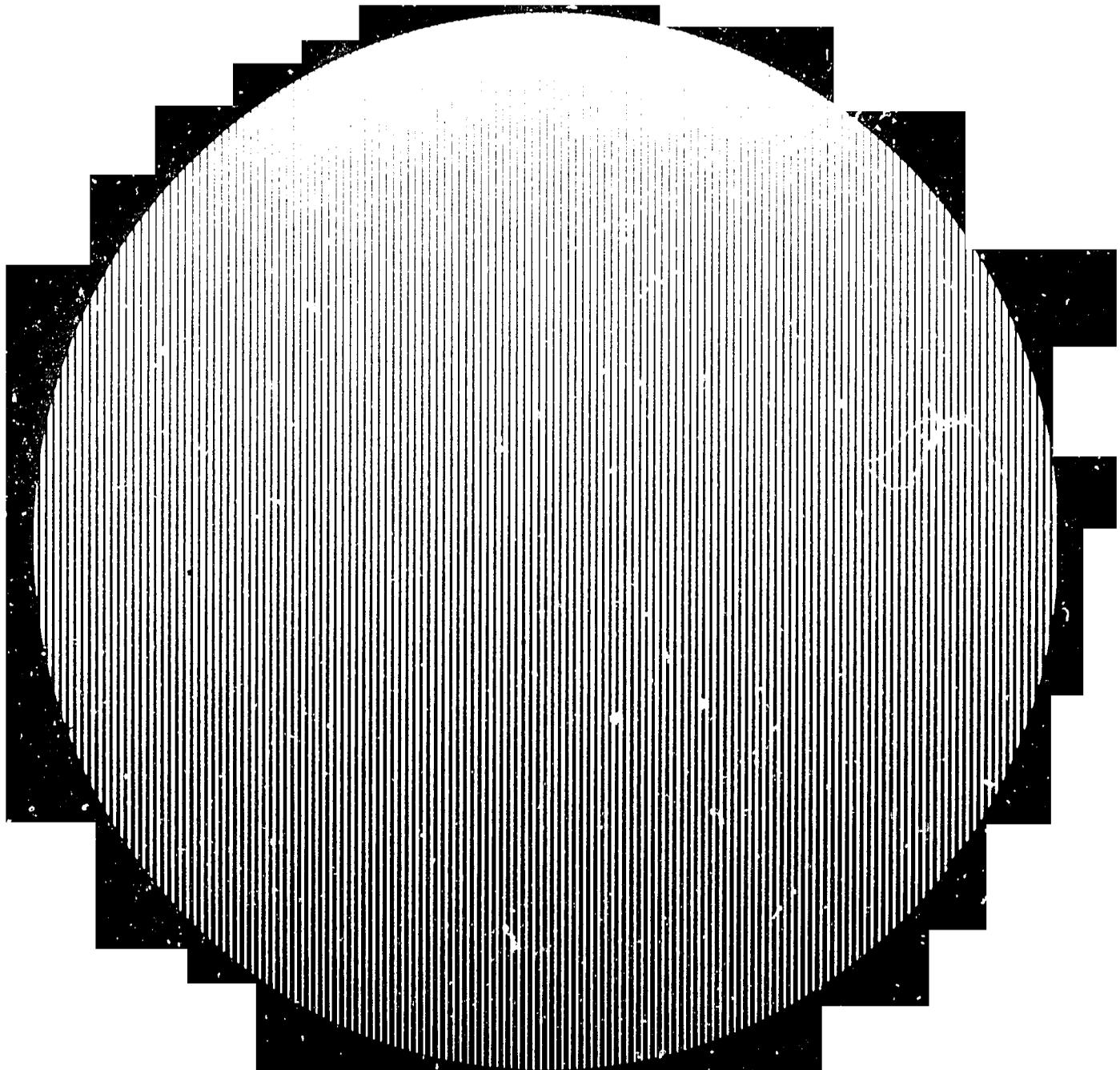


The Construction Industry in Egypt

By
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Prepared by
Technology Adaptation Program
Massachusetts Institute
of Technology
Cambridge, Massachusetts
02139

Sponsored by
United States Agency for
International Development



PN-AAS-753

1211 40048

THE CONSTRUCTION INDUSTRY IN EGYPT

By

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PREFACE

This report is one of a series of publications which describe various studies undertaken under the sponsorship of the Technology Adaptation Program at the Massachusetts Institute of Technology.

The United States Department of State, through the Agency for International Development, awarded the Massachusetts Institute of Technology a contract to provide support at MIT for the development, in conjunction with institutions in selected developing countries, of capabilities useful in the adaptation of technologies and problem-solving techniques to the needs of those countries. This particular study describes research conducted in conjunction with Cairo University, Cairo, Egypt.

In the process of making this TAP-supported study, some insight has been gained into how appropriate technologies can be identified and adapted to the needs of developing countries per se, and it is expected that the recommendations developed will serve as a guide to other developing countries for the solution of similar problems which may be encountered there.

Fred Moavenzadeh

Program Director

ACKNOWLEDGEMENTS

This study was sponsored by the MIT Technology Adaptation Program, which is funded through a grant from the Agency for International Development, United States Department of State. The views and opinions in this report, however, are those of the authors and do not necessarily reflect those of the sponsors.

Much of the data and analyses contained in this report were developed by Tarek Selim in the course of researching and preparing a thesis for a civil engineering degree. In addition the authors wish to acknowledge the many valuable contributions and insights provided by the faculty of Cairo University.

We also wish to thank Anthony Messina for his editorial efforts and to Mary McDavitt and Deborah Harrington for their typing.

ABSTRACT

Egypt's economy is currently experiencing major changes -- changes that are redefining the roles of government and the private sector in the country's development. Construction is affected directly and indirectly by these changes. The industry must keep pace by undergoing attendant changes. To identify actions to effect such change requires an in-depth study of the industry. The purpose of this study is to investigate the operation of the Egyptian construction industry, to identify factors and issues constraining its proper functioning, and to recommend possible measures for improving the efficiency and productivity of the industry.

TABLE OF CONTENTS

Page

| | |
|-----------------------------------------------------------|----|
| CHAPTER I - INTRODUCTION | |
| 1.1 Construction and Egyptian Development | 1 |
| 1.2 Historical Development of the Contracting Industry | 4 |
| 1.2.1 The Situation Before Nationalization: Pre-1961 | 4 |
| 1.2.2 Partial Nationalization of the Industry: 1961-1964 | 4 |
| 1.2.3 Total Nationalization of the Industry: 1964-1967 | 7 |
| 1.2.4 The Industry Under a Large Public Sector: 1967-1973 | 8 |
| 1.2.5 Liberalization of the Industry: 1974-1977 | 10 |
| 1.2.6 The Industry Under the Open Door Policy: Post 1978 | 13 |
| 1.3 Scope of the Study | 15 |
| CHAPTER II - CONSTRUCTION DEMAND | |
| 2.1 Composition of Demand | 17 |
| 2.1.1 Demand for Construction Types | 17 |
| 2.1.2 Private Versus Public Demand | 18 |
| 2.1.3 Geographic Distribution | 20 |
| 2.1.4 Demand for New Construction Versus Maintenance Work | 24 |
| 2.2 Nature of Construction Demand in Egypt | 26 |
| 2.2.1 Fluctuations in Fixed Capital Investment | 28 |
| 2.2.2 Sectoral Distribution of Investment | 29 |
| 2.3 Demand Forecasts | 31 |
| 2.3.1 Construction Output in 1979 | 31 |
| 2.3.2 1980-1984 Government Plans | 32 |
| 2.3.3 Sectoral Considerations | 35 |
| 2.3.3.1 Land (Agriculture and Irrigation) | 36 |

| | <u>Page</u> |
|------------------------------------------------------|-------------|
| 2.3.3.2 Petroleum | 39 |
| 2.3.3.3 Industry and Mining | 40 |
| 2.3.3.4 Contracting | 43 |
| 2.3.3.5 Transport | 43 |
| 2.3.3.6 Electricity | 46 |
| 2.3.3.7 Housing | 47 |
| 2.3.3.8 Other Building | 52 |
| 2.3.3.9 Public Utilities Other than Electricity | 54 |
| 2.3.4 Constraints on Meeting the Desired Demands | 56 |
| 2.3.4.1 Demand Limitations | 56 |
| 2.3.4.2 Capacity of the Industry | 56 |
| 2.3.5 Recommended Levels of Output | 57 |
| CHAPTER III - CHARACTERISTICS OF CONSTRUCTION SUPPLY | 60 |
| 3.1 Nature of Construction Industry | 60 |
| 3.2 The Client Sector | 62 |
| 3.2.1 Residential Building | 63 |
| 3.2.1.1 Private Sector Owners | 64 |
| 3.2.1.2 Public Sector Builders and Owners | 68 |
| 3.2.1.3 Government | 70 |
| 3.2.2 Industrial Building | 72 |
| 3.2.2.1 Private Sector Owners | 73 |
| 3.2.2.2 The Public Sector | 75 |
| 3.2.2.3 Government | 75 |
| 3.2.3 Commercial, Institutional, and Other Building | 76 |
| 3.2.3.1 Private Sector Owners | 76 |
| 3.2.3.2 Public Sector Owners | 77 |

| | <u>Page</u> |
|-----------------------------------------------------|-------------|
| 3.2.3.3 Government | 77 |
| 3.2.4 Roads and Other Civil Works Construction | 78 |
| 3.2.4.1 Private and Public Sector Owners | 78 |
| 3.2.4.2 Government | 80 |
| 3.3 The Professional Sector | 82 |
| 3.3.1 Registration and Number of Professionals | 82 |
| 3.3.1.1 Private Sector Professionals | 83 |
| 3.3.1.2 Public Sector Professionals | 85 |
| 3.3.1.3 Foreign Professionals | 86 |
| 3.3.1.4 Other Professionals in Construction | 89 |
| 3.3.2 The Professional Sector's Operations | 90 |
| 3.3.2.1 Contracts | 90 |
| 3.3.2.2 Costs of Business | 92 |
| 3.3.2.3 Taxation of Professionals | 93 |
| 3.4 Contractors Sector | 93 |
| 3.4.1 Suppliers of Building Materials and Equipment | 93 |
| 3.4.1.1 Local Suppliers | 94 |
| 3.4.1.2 Import/Export Companies | 97 |
| 3.4.1.3 Operation of Suppliers | 100 |
| 3.4.2 Contractors in Egypt | 102 |
| 3.4.2.1 Public Sector Contractors | 102 |
| 3.4.2.2 Private Sector Contractors | 104 |
| 3.4.2.3 Operations of Contractors | 115 |
| 3.5 Constraints on Project Development | 123 |

| | <u>Page</u> |
|-------------------------------------------|-------------|
| CHAPTER IV - CONSTRUCTION RESOURCES | 130 |
| 4.1 Demand for Resources | 130 |
| 4.1.1 Building Materials and Labor | 130 |
| 4.1.2 Construction Equipment Demand | 131 |
| 4.1.3 Demand for Finance | 136 |
| 4.1.3.1 Construction Finance | 136 |
| 4.1.3.2 Investments in Building Materials | 136 |
| 4.1.3.3 Investments in Labor Training | 138 |
| 4.1.3.4 Funds for Equipment Purchases | 138 |
| 4.2 Resources Supply | 138 |
| 4.2.1 Building Materials | 140 |
| 4.2.1.1 Cement | 140 |
| 4.2.1.2 Reinforcing Steel | 150 |
| 4.2.1.3 Bricks | 158 |
| 4.2.1.4 Calcined Gypsum | 166 |
| 4.2.2 Construction Manpower | 177 |
| 4.2.2.1 Site Labor | 177 |
| 4.2.2.2 Management Personnel | 183 |
| 4.2.2.3 Manpower Training | 187 |
| 4.2.3 Construction Equipment | 190 |
| 4.2.3.1 Supply | 190 |
| 4.2.3.2 Operation | 193 |
| 4.2.4 Construction Finance | 195 |
| 4.2.4.1 Construction Project Financing | 195 |

| | <u>Page</u> |
|-------------------------------------------------------------------|-------------|
| 4.2.4.2 Construction Firm Financing | 198 |
| 4.3 Resource Constraints and Their Effects on Construction Supply | 205 |
| CHAPTER V - THE REGULATORY ENVIRONMENT | 212 |
| 5.1 Regulating Construction Activity | 212 |
| 5.1.1 National Planning for Construction | 213 |
| 5.1.2 Relations Between Main Participants | 217 |
| 5.1.2.1 Owners and Users | 220 |
| 5.1.2.2 The Government as Client | 222 |
| 5.1.3 Controlling Construction Work | 225 |
| 5.1.3.1 Physical Planning Process | 225 |
| 5.1.3.2 Standards and Codes of Practice | 227 |
| 5.1.3.3 Contract Documents and Tendering | 228 |
| 5.2 Regulating Relations Between Participants and the Government | 232 |
| 5.2.1 Company Formation | 233 |
| 5.2.2 Company Registration | 235 |
| 5.2.3 Taxation and Recordkeeping | 237 |
| 5.3 Organization of the Government | 249 |
| CHAPTER VI - PROMOTION OF CONSTRUCTION IN EGYPT | 253 |
| 6.1 Improve Coordination and Management of the Industry | 254 |
| 6.2 Improve Planning and Programming for Demand | 254 |
| 6.3 Improve Present Contracting Capabilities | 255 |
| 6.4 Improve Resource Supply | 257 |
| 6.4.1 Building Materials | 257 |
| 6.4.2 Manpower | 257 |
| 6.4.3 Equipment | 258 |

| | <u>Page</u> |
|-------------------------------------------------------|-------------|
| 6.4.4 Finance | 259 |
| 6.4.5 Government Commitment and Action | 260 |
| APPENDIX I - BALANCE SHEETS OF 29 COMPANIES UNDER MOH | 263 |
| APPENDIX II - THE UNIFIED ACCOUNTING SYSTEM | 268 |
| APPENDIX III - CONSTRUCTION PRICE INDICES | 279 |

LIST OF TABLES

| | <u>Page</u> |
|--------------------------------------------------------------------------------------------------------|-------------|
| <u>CHAPTER I</u> | |
| 1.1 Indicators of Construction Sector Contribution to Economy in Egypt in Selected Years | 2 |
| 1.2 Estimated Output by Type of Contractors in Egypt | 5 |
| 1.3 Projects Approved by the General Organization for Arab Foreign Investment and Free Zones | 14 |
| <u>CHAPTER II</u> | |
| 2.1 Distribution of Contracts Executed for Fiscal 1970 and 1971 According to Type of Construction | 19 |
| 2.2 Value of Work Executed in 1970/71 and 1971/72 by Client and Type of Facility | 21 |
| 2.3 1980 Breakdown of Construction Output | 22 |
| 2.4 Geographical Distribution of Projects in Fiscal 1970/71 and 1971/72 by Regions in LE 1000 | 23 |
| 2.5 Output of Construction in Egypt | 25 |
| 2.6 Fixed Capital Investment and Its Distribution Among Sectors | 27 |
| 2.7 Construction Component in Fixed Capital Investment of Some Economic Sectors | 30 |
| 2.8 Estimated Output of Construction in 1979 by Sector | 33 |
| 2.9 Summary of 198-84 Five Year Plan | 34 |
| 2.10 Preliminary Sector Analysis of Demand | 37 |
| 2.11 Growth Rates of GDP and Industry | 42 |
| 2.12 Preliminary Statement of Desirable Road Program | 44 |
| 2.13 Dwelling Units in Urban Egypt 1976 | 48 |
| 2.14 Urban Dwellings Required 1980-2000 | 50 |
| 2.15 Total Cost of Urban Housing Program, Including Maintenance at Three Standards | 51 |
| 2.16 Ministry of Education Program of New Schools | 53 |
| 2.17 Suggested Desired Demand for Public Utilities | 55 |
| 2.18 Recommended Levels of Output | 58 |
| <u>CHAPTER III</u> | |
| 3.1 Distribution of Investment in Housing Among the Various Participants in the 1978-82 Five Year Plan | 65 |
| 3.2 Industrial Production and Investment and Their Distribution Among the Public and Private Sectors | 74 |

| | <u>Page</u> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 3.3 Distribution of Planned Investment in Various Civil Works Projects During 1978-82 Among the Government, Public and Private Sector Clients | 79 |
| 3.4 Distribution of Technical Consulting Projects Approved by the Investment Authority and Producing in Egypt as of 12/31/81 | 88 |
| 3.5 Foreign Suppliers of Building Materials and Construction Equipment in Egypt, Registered as of May 1978. | 99 |
| 3.6 Volume of Work Executed by 29 Companies Under the Ministry of Housing | 103 |
| 3.7 Types of Work Undertaken by Some of the 29 Companies Under the Ministry of Housing in 1979 According to Survey Conducted by World Bank Construction Study Team | 105 |
| 3.8 Number of Contractors in Egypt According to Various Registration Offices | 106 |
| 3.9 Contracts Signed by Private Contractors for Public Sector and Government Work | 109 |
| 3.10 Distribution of Projects in the Area of Contracting Approved by the Investment Authority and Producing in Egypt as of December 31, 1981. | 113 |
| 3.11 Characteristics of US Contractors Working in Egypt During 1981. | 114 |
| 3.12 Eleven Prefabricated Housing Plants Planned for Egypt. | 121 |
| <u>CHAPTER IV</u> | |
| 4.1 Technical Coefficients for the Various Sectors for Selected Resources | 132 |
| 4.2 Estimate of Cement, Reinforcing Steel, and Labor Requirements for 1980-84 Construction | 133 |
| 4.3 Distribution of Equipment Holding by Sector | 135 |
| 4.4 Estimated Equipment Need for Replacing the Construction Industry Fleet | 137 |
| 4.5 Total Requirements of Funds to Finance Construction Program | 139 |
| 4.6 Summary of Cement Production of the Four Public Sector Companies | 142 |
| 4.7 Figures on Production, Trade and Consumption of Cement Felt to Be Representative of the Egyptian Situation Being Derived from a Variety of Sources | 143 |
| 4.8 Local Production by Type of Cement | 145 |
| 4.9 Planned Local Cement Production per Factory | 149 |
| 4.10 Production Capacities and Actual Production of Reinforcing Steel Bars by Company in 1973 | 152 |
| 4.11 Figures on Production, Trade and Consumption of Reinforcing Steel Bars Felt to be Representative of the Egyptian Situation and Derived from a Variety of Sources | 153 |

| | <u>Page</u> | |
|------------------|---------------------------------------------------------------------------------------------------------------------------|-----|
| 4.12 | Estimated Local Rebars Production According to Various Sources | 159 |
| 4.13 | Description of Types of Bricks Produced in Egypt | 161 |
| 4.14 | Production of Different Types of Bricks According to Various Sources | 163 |
| 4.15 | Estimated Future Brick and Manufactured Block Production | 167 |
| 4.16 | Calcined Gypsum Production and Consumption in Egypt | 174 |
| 4.17 | Forecasted Plaster Production | 176 |
| 4.18 | Construction Employment as a Percentage of Total Employment with Two Alternative Series of Construction Employment | 178 |
| 4.19 | Average Daily Money Wage in L.E. for Various Construction Works | 179 |
| 4.20 | Various Labor Production in the Industry | 182 |
| 4.21 | Composition of Labor Force in Some Sectors | 184 |
| 4.22 | Share of Each L.E. Paid in Wages in Both Public and Private Sector Contractor Output | 186 |
| 4.23 | Training by Training Organization of Ministry of Housing | 189 |
| 4.24 | The Egyptian Equipment Fleet in 1979 | 191 |
| 4.25 | 1979 Equipment Costs | 194 |
| 4.26 | Savings and Investments in Egypt from Different Sources | 197 |
| 4.27 | Finance from Banks to the Contracting Sector as of 12/31/79. | 200 |
| 4.28 | Fixed Assets and Working Capital for 29 Companies under Ministry of Housing as Percent of Work Done in Egypt at 12/31/78. | 202 |
| 4.29 | Financial Characteristics of Public Sector Contracting Companies 1978. | 204 |
| 4.30 | Construction Price Indices for Differing Facility Types | 207 |
| <u>CHAPTER V</u> | | |
| 5.1 | Tax Collections as Reported by the Cairo Tax Office for Construction Under the Ministry of Finance (LE 1000) | 242 |
| 5.2 | General Income Tax Rates Levied on all Individuals in Egypt | 247 |

LIST OF FIGURES

| | <u>Page</u> |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Figure 3.1 Major Participants and Steps in Conventional Project Construction, Together with Major Functions and Arrival Times of Participants | 61 |
| Figure 4.1 List Prices and Costs of Steel Rebars | 157 |
| Figure 5.1 Government Organizations Involved in the Development and Implementation of Transportation Projects in the Cairo Metropolitan Area | 214 |
| Figure 5.2 Excerpts from Typical General Conditions of Contract | 230 |
| Figure 5.3 Diagram Showing Interrelationships Between Various Levels of Government | 252 |

CHAPTER 1

INTRODUCTION

Egypt's economy is currently experiencing major changes -- changes that are redefining the roles of government and the private sector in the country's development. Construction is affected directly and indirectly by these changes. The industry must keep pace by undergoing attendant changes. To identify actions to effect such change requires an in-depth study of the industry. The purpose of this study is to investigate the operation of the Egyptian construction industry, to identify factors and issues constraining its proper functioning, and to recommend possible measures for improving the efficiency and productivity of the industry.

1.1 CONSTRUCTION AND EGYPTIAN DEVELOPMENT

The construction sector is important to Egyptian development. While its contribution to the country's gross domestic product (3 to 5 percent in the 1960's and 1970's) and employment (2 to 3 percent) is small, its contribution to fixed capital investment is significant. Over the past two decades construction output has represented from 40 to 60 percent of total FCI (Table 1.1). Since an increase in fixed capital investment, or capital formation, is a necessary condition for economic development, the importance of the construction industry in Egyptian development cannot be overemphasized. Moreover, the industry will play a vital future role in reconstructing the country's housing and infrastructure facilities. A developing nation cannot expect an immediate return in national product and employment on its construction investment, but in time, as facilities become operational and the labor force gains

TABLE 1.1
Indicators of Construction Sector Contribution
to Economy in Egypt in Selected Years
Source: Reference (11, 26)

| Year/Fiscal Year | | 1960 | 1966 | 1972 | 1973 | 1974 | 1977 | 1978 |
|------------------|-------------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Total | GDP ⁽¹⁾ LE Million | 1,348.15 | 2,166.6 | 3,255.9 | 3,464.5 | 4,111.0 | 6,241.0 | 7,809.0 |
| | GFCI ⁽²⁾ LE Million | 198.3 | 374.8 | 428.1 | 472.1 | 645.1 | 1,840.0 | 2,225.0 |
| | Labor Force ⁽³⁾ in (1000) | 7,734.0 | 8,334.0 | 9,471.0 | N.A. | 9,678.0 | N.A. | N.A. |
| Construction | Output ⁽⁴⁾ LE Million as % of GFI | 106.8 53.9 | 193.0 51.1 | 268.6 62.7 | 277.5 58.7 | 340.0 52.7 | 774 42.1 | N.A. |
| | Value Added ⁽⁴⁾ LE Million as % of GDP | 45.6 3.4 | 94.6 4.4 | 123.0 3.8 | 118.1 3.4 | 134.9 3.3 | 285.0 4.2 | 336.0 4.3 |
| | Labor Force ⁽³⁾ in (1000) as % of Total | 151.1 2.3 | 203.5 2.7 | 206.9 2.3 | N.A. N.A. | 232.9 2.6 | N.A. N.A. | N.A. N.A. |
| Agriculture | Value Added ⁽⁴⁾ LE Million as % of GDP | 398.3 29.5 | 610.4 28.2 | 958.4 29.4 | 1,062.4 30.7 | 1,280.0 31.1 | 2,038.0 30.2 | 2,241.0 28.7 |
| | Labor Force ⁽³⁾ in (1000) as % of Total | 3,697.9 53.5 | 3,973.7 52.0 | 4,655.7 52.8 | N.A. | 4,198.3 50.5 | N.A. | N.A. |
| | Value Added ⁽⁴⁾ LE Million as % of GDP | 282.5 21.0 | 469.3 21.7 | 676.3 20.8 | 689.5 19.9 | 842.8 20.5 | 1,581.0 23.5 | 1,881.0 24.1 |
| Industry | Labor Force ⁽³⁾ in (1000) as % of Total | 691.1 10.0 | 1,044.0 13.6 | 1,133.4 12.8 | N.A. | 1,375.4 15.1 | N.A. | N.A. |

(1) GDP = Gross Domestic Product at current factor cost. Source: Reference (26)

(2) GFCI = Gross Fixed Capital investment. These values include investments in land. Source: Reference (26)

(3) Labor Force = All those between the ages of 12 and 65, employed and unemployed. Source Reference (11).

(4) Value Added = Total output of the sector - value of intermediate inputs from other sectors. Source Ref (11).

experience, this investment will produce the desired growth and employment opportunities for the population.

Construction depends heavily on other segments of the economy for its production inputs. Over the past two decades, these inputs have represented between 54 percent in 1954 and 61 percent in 1973 of sectoral production. Industry and manufacturing represented over 50 percent of these inputs, while the services and mining sectors accounted for 19 percent each, and transportation 4 percent (11). While the construction industry depends on the adequacy of supply of these inputs, by offering a market for these ancillary industries, it can serve in turn to stimulate further economic growth.

The timely completion of construction projects also has an impact on the investment process, and hence development. Construction of a facility must be completed before a new project can be used. The period required to complete the construction component of investment is lengthy, often greater than the procurement and installation of equipment. Thus, economic growth in a particular year must be geared to the capacity of the construction industry realized a year or more earlier, highlighting the key role of contractors in the development process.

Recent changes in Egypt have affected resource markets, the nature of the projects, and the established technologies. The new role of the private sector, labor shortages, new towns, and prefabrication techniques are but a few examples of the changes raising new challenges for the Egyptian construction industry. These have been partly reflected in recent increases in the prices of both inputs and final products; but because the country's resources are limited, Egypt cannot

afford to have the industry's increase in output to be absorbed by price increases. Efforts thus must be directed to raise the capacity as well as the efficiency of the industry.

1.2 HISTORICAL DEVELOPMENT OF THE CONTRACTING INDUSTRY

Since 1961, construction in Egypt has been largely a public sector operation. The government engages directly in construction through routine force account work and, more importantly, through its participation in nearly fifty very large contracting firms. Of a total industry output of LE 1350 million in 1979, LE 885 million belonged to the public sector and only LE 465 million, or 34 percent, to private sector contractors (Table 1.2). Contractors supervised by the former Ministry of Housing and Reconstruction (now the Ministry of Housing and the Ministry of New Communities) are given special attention in this report, as they represent the majority of contractors and production.

1.2.1 The Situation Before Nationalization: Pre-1961

In 1959/60, 1,759 private construction firms employing 15,191 workers produced facilities whose total value was LE 115 million. The first Five-Year Economic and Social Development Plan (1960/61-1964/65) highlighted building and construction projects worth LE 705.1 million, or about 45 percent of total investment. These projects, perceived as critical to the provision of basic needs and the developing economy, were in large part government financed.

1.2.2 Partial Nationalization of the Industry: 1961-1964

In July 1961, Laws 117, 118, and 119 (the Socialist Laws) brought under government control 13 to 17* companies. One company,

* Sources differ on the exact number of companies nationalized.

TABLE 1.2
ESTIMATED OUTPUT BY TYPE OF CONTRACTORS IN EGYPT
(MAIN CONTRACTS) IN 1979
Source: Reference (23)

| | VALUE LE MILLION | PERCENT % |
|-------------------------------------------|---------------------|----------------|
| <u>PUBLIC SECTOR</u> | | |
| Under Ministry of Housing 30 companies | 665 | 49 |
| Under Other Ministries 24 companies | 214 ^(a) | 16 |
| Total Public Contractors | <u>879</u> | <u>65</u> |
| Subcontracts (about 5%) | (44) | -3 |
| Total less Subcontracts | <u>835</u> | <u>62</u> |
| Force Account Work | 50 | +4 |
| Total Public | <u>885</u> | <u>66</u> |
| <u>PRIVATE SECTOR</u> | | |
| Top 10 Contractors | 70 | 5 |
| Others | 330 | 24 |
| Projects by Expatriates ^(b) | 65 | 5 |
| Total Private | <u>465</u> | <u>34</u> |
| GRAND TOTAL | <u>1350</u> | <u>100</u> |

(a) estimated output of the 4 companies under Ministry of Transport, the 11 companies under Irrigation and Land Reclamation, the 4 companies under the Ministry of Industry, and the 4 companies under Ministry of Electricity.

(b) including Suez Canal Authority.

Egyptian Dredging Company, was fully nationalized, while the government participated with 50 percent of the capital in the others. Shortly thereafter, a ceiling of LE 100,000 per year was set on the letting of contracts by government agencies and public sector organizations to private sector companies, of which about 150 could perform work for the government. To increase capacity to levels sufficient to meet the targets of the development plan, Law 156 was issued in September 1961 allowing privately owned companies to join the public sector by requesting the government to participate with 50 percent of their capital. By 1963, 70 companies had taken this option. To manage the growing number of companies, Presidential Decree 1525 of 1961 created the General Organization for Contracting and Construction. After the number of companies exceeded 70, in November 1962, Presidential Decree 3111 placed these companies under the administration of three organizations: the Egyptian General Organization for Civil Works; the Egyptian General Organization for Housing and Public Buildings; and the Egyptian General Organization for Utility Contracts.

While all public companies participated in the development plan, the government encountered resistance, principally in the form of not bidding on projects, from the owners of the previously private held companies who had been kept on as managers of the new companies. To overcome this difficulty, Presidential Decree 147 (1962) authorized the Ministry of Housing and Utilities to assign work through direct orders to public sector contractors.

1.2.3 Total Nationalization of the Industry: 1964-1967

On March 8, 1964, Law 52 nationalized completely 120 companies, including those that had previously joined the public sector, and made the nationalization retroactive to 1961. The output of these companies in 1964-65 totalled LE 75 million. Because most of the firms at the time of nationalization were relatively small, with assets of a few thousand pounds, the government grouped them together, forming new companies. These companies were then placed under the supervision of the general organizations to coordinate their work.

The companies and the general organizations comprising the public sector were reorganized many times in the following years. In 1964, the 120 public sector firms were incorporated into 35 public companies. The following year, a Presidential Decree again reshuffled these firms, increasing their number to 41. In July, 1965, the Egyptian General Organization for Public Buildings became the fourth general organization to supervise public sector construction companies. Subsequently, the responsibilities of the General Organization for Utility Contracts were expanded to include supervision of the potable water and sanitary disposal companies. The number of general organizations was reduced to three when the Egyptian General Organization for Housing and Public Works (later renamed the General Organization for Building and Construction) subsumed the former organizations of civil works and housing; this organization was also assigned responsibility for design work. Just over a year later, in March 1967, Presidential Decree 908 again reorganized the entire sector: the Egyptian General Organization for Utility Works was dissolved, the Egyptian General Organization for Building Contracts was created, and the name of the Egyptian General

Organization for Building and Construction was changed to the General Organization for Civil Construction Contracts. Following yet more changes in the 41 companies, the Ministry was finally left with 34 companies operating under the jurisdiction of two general organizations.

1.2.4 The Industry Under A Large Public Sector: 1967-1973

In 1968, the Ministry of Housing and Utilities undertook a study (Reference 1) on the organization and economic reform of the building and construction sector of the Egyptian economy. The study identified three major constraints on the sector:

1. The First Five-Year Plan: The plan lacked detail and clarity for construction, and planned only a 6 percent increase for the sector. A lack of coordination among sectors, especially with those producing inputs to construction, resulted in delays and rising costs. Costs of housing construction rose 46 percent from 1960/61 to 1964/65 -- attributable equally to materials and labor.
2. Laws and Regulations: Considerable changes and instability both in the supervision of the sector and the companies themselves took place from 1961 to 1967. The retroactivity of Law 52 of 1964 compounded the problems of administering the companies, since they were now held responsible for losses incurred from 1961 to 1964 over which they exercised no control. Moreover, there was extensive litigation and conflict, as the previous owners were required by the same law to refund any income/ profits they had shown in the three years they worked in the mixed sector.

3. Other Constraints: Fluctuating demand and labor laws caused fixed costs to rise. Also, contractual procedures did not keep pace with the changing nature of the sector, and suppliers required advance payment despite the fact that contractors were not paid until their work was completed.

To evaluate the performance of public sector companies, Presidential Decree 4723 of 1966 required bookkeeping and accounts of all public sector companies to follow the Unified Accounting System (9), beginning with fiscal year 1967/68. The system was intended to provide basic information, planning budgets, and final accounts at the level of the individual firm for evaluating its activities and overall financial position as well as in decision and policy making. The fiscal year, the index of accounts, the basic accounting rules, the final statements, and the planning budgets were identical for all firms. The system remains in use by all public sector units except banks and insurance companies. Liquidations and amalgamations reduced the number of public sector companies to 27, plus the two general contractors under the direct supervision of the Minister of Housing and Utilities.

The private sector's role in construction in Egypt diminished considerably in the sixties and early seventies, seriously constrained by the ceiling placed on government and public contracts which private firms were allowed to undertake. Private sector activity was concentrated in housing construction and subcontracting to the public sector.

1.2.5 Liberalization of the Industry: 1974-1977

By the early seventies, the government perceived that the main objectives of the Socialist laws, "ending the dominance of foreign speculators and the protection of the few who exercised influence on the government to continue exploitation at the expense of the masses" (37 - Volume III), had been fulfilled. Attention was turned to domestic "take-off" and stabilization of the country's economic situation by the year 2000, when the population of the country was expected to double. In order to achieve these goals and enhance the use of local resources, the government opted to invite foreign expertise in an Open-Door Policy.

In 1971 Law 65 governing investment of Arab capital and free zones was passed as an early attempt to implement this new policy. The Ministry of Reconstruction, established in 1973, was charged with the immediate planning for reconstruction and future development of the Suez Canal Zone, as well as the coastal zones of the Western and Eastern Deserts and the new settlements around greater Cairo. To help it carry out its charge, the Ministry was handed the supervision of the two largest contracting companies, Arab Contractors Company (Osman A. Osman and Partners) and El Nasr Company for General Contracting (Hassan Allam and Company). The Ministry of Reconstruction was subsequently combined with that of Housing and Utilities into one ministry, the Ministry of Housing and Reconstruction, in May 1974. In 1975 the new Ministry was expanded to include public sector building materials producers and four road building contractors. The executive arm of the Ministry was then composed of 54 companies: 34 contractors, 11 building materials producers, one design firm, and 10 land development companies.

In June 1974, Law 43 invited Arab and foreign investment in:

1. Industrialization, mining, energy, tourism, transportation and related fields.
2. Reclamation and cultivation of barren land under long-term tenancy (not to exceed 50 years, with a possible renewal for an additional 50 years), and projects for developing animal production and water wealth.
3. Projects for housing and for urban development (the division of land into parcels and the construction of new buildings together with the public utilities connected therewith), with building to be completed within a period specified by the Authority's Board of Directors, and with no obligation on the part of the State to vacate this property.
4. Investment companies which channel funds to the fields enumerated in this Law.
5. Investment banks, merchant banks and reinsurance companies whose transactions are effected in free currencies.
6. Banks engaging in local currency transactions, provided these are joint ventures in which local Egyptian capital holds at least 51 percent.
7. Construction activities in regions outside agricultural areas and the perimeters of existing cities.
8. Construction contracting activities undertaken by Joint Stock Companies in which there is at least 50 percent Egyptian capital participation.

9. Technical consulting activities by Joint Stock Companies in partnership with foreign consultants (on projects within the scope of activities defined in this law when their services are indispensable to these projects) approved by the Authority's Board of Directors. Priority projects are those designed to generate exports, encourage tourism or reduce the need to import basic commodities, as well as those which require technical expertise or make use of patents or trademarks with a worldwide reputation.

Law 32 (1977) encouraged the participation of the Egyptian private sector in the nation's development, by expanding the areas for foreign investment defined by Law 43 (1974) to include "projects established with Egyptian capital and owned by Egyptian nationals." The amended Law also allowed foreign capital to invest without local partners, subject to the approval of two-thirds of the members of the Board of Directors of the General Authority of Investment and Free Zones.

Presidential Decree 1868 (December 1974) cancelled Presidential Decree 1203 of 1961, and raised the ceiling on contracts awarded to the private sector by the government from LE 100,000 to LE 500,000 per year, or LE 1,000,000 over two consecutive years. It also exempted the companies established under the Arab and Foreign Investment Laws from any ceiling. The ceiling on contracts for all private sector firms was eliminated in February 1978.

In September 1975, Law 111 reorganized public sector construction companies. The two general organizations were phased out over a period of six months, and their responsibilities transferred to the Board of Directors of each company. Higher councils comprised of company

chairmen and headed by the appropriate Minister were established in their place, but with considerably less authority.

1.2.6 The Industry Under the Open Door Policy: Post 1978

The private sector responded to the change in national policy with an increased effort in construction. The number of contractors registered with the Office of Private Sector Contractors in the Ministry of Housing to work for the government and the public sector rose from 11,543 in 1973 to 15,878 in 1978. Many private firms took advantage of the provisions of Law 43 and its amendment, and by the end of 1981, 1266 projects had been approved, of which 436 had commenced operations (Table 1.3). Sixty-six percent of the contract firm assets are Egyptian, as are 63 percent of the consulting firms, 69 percent of the housing projects and 64 percent of the investment firms.

In early 1978, the Ministry was once again divided, into the Ministry of Housing and the Ministry of Development and New Communities. The four companies specializing in road construction were returned to the supervision of the Ministry of Transportation and Communication.

These constant changes in the organization and operation of the construction industry in Egypt pose serious problems and aggravate the already prevalent lack of confidence in the industry. Sectoral management and organization are weak, and there exists a need to strengthen these capabilities. Some apparently technical problems may in fact be institutional or organizational. For example, shortages of certain materials like cement have eased, but appear to persist because of mismanaged allocation, distribution, and usage. Similarly, the extensive informal construction around the main urban areas reflects a

TABLE 1.3

PROJECTS APPROVED BY THE GENERAL ORGANIZATION
FOR ARAB FOREIGN INVESTMENT AND FREE ZONES
Source: Reference (3)

| SECTOR | STATUS OF PROJECTS AS OF 12/31/81 | | | | | | | |
|--------------------------|-----------------------------------|-----------------------|-----------|---------|-----------------|---------|----------------------------------|---------|
| | All Projects | | Producing | | Under Execution | | Recently ⁽³⁾ Approved | |
| | number | Capital LE Million | Number | Capital | Number | Capital | Number | Capital |
| INDUSTRIAL (1) | | | | | | | | |
| Construction | | | | | | | | |
| Materials | 80 | 237.1 | 14 | 22.7 | 24 | 105.7 | 42 | 108.7 |
| Total | 506 | 1471.1 | 186 | 227.0 | 124 | 364.2 | 196 | 879.9 |
| NON-INDUSTRIAL (2) | | | | | | | | |
| Banks | 76 | 577.1 | 44 | 281.1 | 18 | 205.5 | 14 | 90.5 |
| Housing | 63 | 172.1 | 13 | 14.8 | 44 | 129.4 | 6 | 27.9 |
| Contracts | 122 | 114.2 | 48 | 42.8 | 28 | 20.7 | 46 | 50.7 |
| Technical Consultancy | 29 | 9.4 | 17 | 7.4 | 2 | .3 | 10 | 1.7 |
| Investment | 177 | 682.2 | 52 | 337.9 | 37 | 134.0 | 88 | 210.3 |
| Tourism | 116 | 512.9 | 27 | 54.5 | 50 | 213.9 | 39 | 244.5 |
| TOTAL | 760 | 2572.2 | 250 | 865.4 | 216 | 783.0 | 294 | 923.8 |
| GRAND TOTAL | 1266 | 4043.3 | 436 | 1092.4 | 340 | 1147.2 | 490 | 1803.7 |

- (1) Other industrial activities listed are:
Spinning & Weaving, Food, Metal, Engineering, Mining, Chemical, Pharmacological, Petroleum and Wood.
- (2) Other non-industrial activities listed are:
Agriculture and Animal Husbandry, Transport & Communications, Health & Hospitals, Services.
- (3) The source does not define the term "recently Approved projects". From the covenant of Law 43 however; which indicate that projects approved have to be started within 6 months, we can assume that those listed here are those approved within the 6 to 12 months prior to 12/31/81.

mismatch between the actual needs of the people and the actions undertaken by the government.

1.3 SCOPE OF THE STUDY

This study is principally concerned with the operation of formal contract construction in Egypt. It analyzes the issues facing the industry from a holistic view of construction as a process propelled by the interaction of demand and supply for constructed facilities involving several participants.

Chapter II first reviews the past and present composition and nature of construction demand. It then analyzes government plans and their implied forecasting demand, identifies the constraints on meeting this demand, and estimates a recommended level of output. Chapter III details the supply of constructed facilities in Egypt. It examines the relations among the participants, describes the main characteristics and operations of clients, professionals, contractors, and suppliers, and concludes by identifying the constraints on construction project development. Chapter IV investigates the supply of demand for the resources used in construction. First it attempts to translate construction demand into its component resources and then to analyze the supply of building materials (cement, rebars, bricks and gypsum), labor, equipment, and finance (project and construction). The analysis includes present production, distribution and future supply. Finally, resource constraints and their effects on construction supply are identified. Chapter V studies the regulatory environment with specific emphasis on construction planning and control processes and procedures. The chapter also reviews company information, taxation and registration requirements in Egypt, as well as the organization of the Egyptian government.

Chapter VI summarizes the issues facing the industry and offers a set of recommendations designed to improve construction delivery. Central to these recommendations is the role government must play in promoting the efficiency and increased capacity of this industry so crucial to Egyptian development.

Extensive use has been made of published and unpublished data on the national economy, the industry, and public and private sector contractors. The analysis of the effects and interactions of the issues on the participants draws heavily from interviews in Cairo with public and private participants, including four consulting firms, seven private sector contractors, five public sector contractors, two materials suppliers, and numerous government officials. Information garnered from these interviews augments the somewhat dated statistics available on the industry.

CHAPTER II

CONSTRUCTION DEMAND

This chapter will analyze some of the major characteristics of the demand for construction in Egypt. The analysis is divided into three 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 emphasizes the special nature of this demand in Egypt, its fluctuations, and sectoral distribution. Finally, in the third section estimates of future demand are calculated.

2.1 COMPOSITION OF DEMAND

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

2.1.1 Demand for Construction Types

Construction projects can be grouped under two main headings: (a) building construction and (b) non-building construction. Building construction can be further divided into: (a) residential buildings; (b) industrial buildings; and (c) other buildings, which includes other buildings intended for commercial, health, educational, etc. purposes. Non-building construction encompasses: (a) road construction and (b) other non-building construction such as power stations, canal work, utilities works, and so forth.

Statistics on the distribution of construction output by type of facilities in Egypt are virtually non-existent. The only available information dates from the early seventies. Table 2.1 shows the value of non-building construction accounted for 42-48 percent of the total, while residential buildings accounted only for 8-11 percent.

When comparing these figures with those found in other developing countries, which average 40 percent residential and 35 percent non-building, Egyptian residential building appears too low (46). Four factors could account for such disparities in the figures. First, it is possible, though unlikely, that the definition of the construction project may be different in Egypt from that used in the Yearbook of Construction Statistics (Reference 46). Second, official Egyptian figures do not include the large component of informally constructed residential buildings. Third, these figures illustrate the effect of rent control and the reluctance of the private sector, the main supplier of residential buildings, to invest in this area. Finally, they reflect the bias of the government and its emphasis on large projects in the industrial and non-building sectors. This distribution and emphasis between sectors will be investigated further in the following sections.

2.1.2 Private Versus Public Demand

Like construction production which is dominated by the public sector, public demand in Egypt is dominant. The government and the public sector firms owned by the government are the largest clients in the industry, even after the enactment of the Open Door Policy and the encouragement of the private sector. In 1980, for example, the output

TABLE 2.1

Distribution of Contracts Executed for Fiscal 1970 and 1971
According to Type of Construction

Source: References (7), (8)

| Type of Project | Fiscal Year | Executed Contracts | | | |
|--------------------|-------------|--------------------|-----|-------------------|-----|
| | | Number | % | Value* LE 1000 | % |
| Residential | 70/71 | 2,868 | 29 | 8,984 | 8 |
| | 71/72 | 1,861 | 25 | 14,117 | 11 |
| Industrial | 70/71 | 1,342 | 14 | 23,656 | 22 |
| | 71/72 | 1,091 | 15 | 39,794 | 30 |
| Other Building | 70/71 | 3,634 | 38 | 22,700 | 21 |
| | 71/72 | 2,939 | 39 | 24,476 | 18 |
| Roads | 70/71 | 331 | 4 | 19,790 | 18 |
| | 71/72 | 299 | 4 | 27,252 | 20 |
| Other Non-Building | 70/71 | 1,499 | 16 | 32,741 | 30 |
| | 71/72 | 1,354 | 18 | 29,014 | 22 |
| Total | 70/71 | 9,574 | 100 | 107,871 | 100 |
| | 71/72 | 7,544 | 100 | 134,651 | 100 |

*Values do not include work subcontracted by public sector contractors.

of the private sector was only 20 percent, which was five times higher than in 1970 (see Table 2.2), when private owners accounted for only 4 percent of the output. In 1970 and 1971 the private sector was almost negligible in all types of construction except residential, where its share was about 18 percent.

Table 2.3 shows that private sector shares have increased in all categories except non-building, where the government is still dominant. The breakdown of the 1980 estimate of construction output by economic sector shows that private sector demand in residential, industrial, and non-building construction has increased considerably over its 1970 level. It is expected that such trends will continue, provided the government's Open Door Policy remains in effect.

2.1.3 Geographic Distribution

Traditionally, the Governorate of Cairo has concentrated the largest number of projects; 25 to 30 percent of all projects were located in Cairo between 1940 and 1972, while the other 23 governorates of Egypt divided the remaining 70 to 75 percent, as indicated in Table 2.4. Building construction and residential building projects are also more numerous in Cairo than in most of the other governorates, while other building projects seem to be larger, relatively-speaking, in the Delta and Upper Egypt. Numerous warehouses and administrative and educational buildings were built outside Cairo in the late 1960's. The average size of non-building construction projects in the Delta and Upper Egypt regions is larger than in Cairo, which is attributable to the land-reclamation and industrial-infrastructure projects undertaken there.

Table 2.2

VALUE OF WORK EXECUTED IN 1970/71 AND 1971/72
BY CLIENT AND TYPE OF FACILITY
(IN LE 1000)

Source: Reference (7), (8)

| Type of Client | Fiscal Year | Residential | | Industrial | | Commercial/ Institutional | | Roads | | Non-Building | | Total | |
|----------------|-------------|-------------|----|------------|----|------------------------------|----|--------|----|--------------|----|--------|----|
| | | Value | % | Value | % | Value | % | Value | % | Value | % | Value | % |
| Government | 70/71 | 4,856 | 43 | 7,148 | 23 | 15,212 | 57 | 10,225 | 45 | 28,251 | 73 | 65,692 | 50 |
| | 71/72 | 9,979 | 57 | 6,450 | 13 | 18,608 | 60 | 16,091 | 52 | 20,377 | 58 | 71,505 | 44 |
| Public Sector | 70/71 | 4,412 | 39 | 23,118 | 75 | 10,022 | 38 | 12,549 | 54 | 9,974 | 26 | 60,075 | 46 |
| | 71/72 | 5,241 | 30 | 42,072 | 86 | 10,236 | 33 | 14,318 | 47 | 13,781 | 39 | 85,648 | 52 |
| Private Sector | 70/71 | 2,011 | 18 | 398 | 2 | 1,472 | 5 | 155 | 1 | 549 | 1 | 4,585 | 4 |
| | 71/72 | 2,338 | 17 | 424 | 1 | 2,421 | 7 | 167 | 1 | 753 | 3 | 6,103 | 4 |

TABLE 2.3

1980 Breakdown of Construction Output

Source: Reference (22)

| | Total | Land | Industry | Transport | Public Utilities | Housing | Building |
|---------|-------|------|----------|-----------|---------------------|---------|----------|
| Public | 80 | 83 | 83 | 95 | 100 | 31 | 99 |
| Private | 20 | 17 | 17 | 5 | - | 69 | 1 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

TABLE 2.4

Geographical Distribution of Projects in Fiscal 1970/71 and 1971/72
by Regions in LE 1000

Source: Reference (7), (8)

| Region ⁽¹⁾ | Fiscal Year | PROJECT CATEGORY | | | | | | | | | |
|-----------------------|----------------|------------------|-------|------------|-------|-------------------|--------|--------|-------|--------------|-------|
| | | Residential | | Industrial | | Other Building | | Roads | | Non-Building | |
| | | Number | Value | Number | Value | Number | Value | Number | Value | Number | Value |
| Cairo | 70/71 | 674 | 1,102 | 308 | 1,670 | 1,062 | 3,333 | 38 | 325 | 110 | 604 |
| | 71/72 | 439 | 1,115 | 237 | 1,123 | 765 | 2,891 | 40 | 504 | 106 | 1,064 |
| Alexandria | 70/71 | 376 | 595 | 322 | 1,283 | 537 | 1,234 | 24 | 366 | 81 | 684 |
| | 71/72 | 272 | 616 | 256 | 1,179 | 481 | 1,716 | 25 | 472 | 78 | 540 |
| Canal Zone | 70/71 | 7 | 80 | 1 | - | 13 | 32 | 1 | 2 | 12 | 170 |
| | 71/72 | 1 | 10 | - | - | 8 | 16 | 2 | 7 | 10 | 99 |
| Lower Egypt | 70/71 | 933 | 1,233 | 280 | 1,441 | 713 | 2,635 | 67 | 439 | 476 | 3,716 |
| | 71/72 | 561 | 1,539 | 197 | 1,122 | 560 | 2,866 | 36 | 402 | 319 | 3,546 |
| Upper Egypt | 70/71 | 596 | 1,321 | 133 | 525 | 836 | 2,423 | 65 | 744 | 304 | 2,167 |
| | 71/72 | 389 | 1,373 | 112 | 459 | 625 | 2,551 | 53 | 504 | 312 | 3,279 |
| TOTAL | 70/71 | 2,586 | 4,331 | 1,044 | 4,918 | 3,161 | 9,657 | 195 | 1,876 | 983 | 7,341 |
| | 71/72 | 1,662 | 4,653 | 802 | 3,883 | 2,439 | 10,040 | 156 | 1,889 | 825 | 8,528 |

NOTE: (1) Canal Zone region includes the governorates of Port Said, Ismailia and Suez. The figures are very small because the region had been evacuated after the war in 1967. Lower Egypt includes the governorates north of Cairo. Upper Egypt includes all governorates south of Cairo. The figures do not include the border governorates of Egypt, namely, the new valley, the Western Desert and the Red Sea governorates.

The table does not show, however, the historic changes that occurred in the geographic distribution of projects over the past two decades. The first of two important changes occurred during the sixties with the construction of the High Dam in Aswan, which increased construction output in that governorate; actually, construction employment peaked there in the late sixties, at almost double that of Cairo (11). The second change occurred in the second half of the 1970's, when reconstruction efforts started in the Suez Canal governorates and a new drive was initiated to create settlements in the desert. The first reconstruction efforts to rebuild the war-damaged cities were completed by 1977; this entailed some concentration of effort in these governorates over a period of 3 years (36). The new settlements policy is still in its early stages and only time can judge the result of its implementation. This policy will no doubt have effects on the industry since it is expected to absorb some 50 percent of the nationwide increase in construction employment in the first five years of its implementation (63).

2.1.4 Demand for New Construction Versus Maintenance Work

Existing figures on construction output in Egypt show it to be largely composed of new facilities (Table 2.5); repair and maintenance activities have not exceeded 10 percent of the total output for the last two decades, averaging about 8 percent. This is to be expected in developing countries which, in their march toward development, are faced with the necessity of providing new facilities. The Egyptian figures however, emphasize the low priority attributed to maintenance; repair and maintenance in most developing countries

Table 2.5
Output of Construction in Egypt

(Values in LE Million)

Source: Reference (62)

| Year | Total* Output in Current L.E. | Output of New Construction | Maintenance and Repair Value | % |
|---------------------|----------------------------------|-------------------------------|---------------------------------|------|
| 1960/61 | 111.5 | 95.3 | 16.2 | 14.5 |
| 1961/62 | 143.5 | 126.4 | 17.1 | 11.9 |
| 1962/63 | 170.8 | 154.8 | 16.0 | 9.4 |
| 1963/64 | 206.1 | 191.1 | 15.0 | 7.3 |
| 1964/65 | 181.2 | 164.9 | 16.3 | 9.0 |
| 1965/66 | 197.9 | 181.1 | 16.8 | 8.5 |
| 1966/67 | 188.1 | 170.6 | 17.5 | 9.3 |
| 1967/68 | 186.3 | 169.3 | 17.0 | 9.1 |
| 1968/69 | 227.7 | 209.9 | 17.8 | 7.8 |
| 1969/70 | 246.5 | 227.1 | 19.4 | 7.9 |
| 1970/71 | 245.9 | 220.9 | 25.0 | 10.2 |
| 1971/72 | 259.8 | 235.3 | 24.5 | 9.4 |
| 1972 | 316.0 | N/A | N/A | N/A |
| 1973 | 227.3 | 251.8 | 25.5 | 9.2 |
| 1974 | 340.0 | 313.0 | 27.0 | 7.9 |
| 1975 | 542.1 | 506.3 | 35.8 | 6.6 |
| 1976 | 716.0 | 667.5 | 48.5 | 6.8 |
| 1977 | 774.0 | N/A | N/A | N/A |
| 1978 | N/A | N/A | N/A | N/A |
| 1979 ⁽¹⁾ | 1350.0 | 1280.0 | 70.0 | 5.2 |
| 1980 ⁽²⁾ | 1543.0 | 1465.0 | 78.0 | 5.1 |

*Includes output of the armed forces which is not distributed between new construction and maintenance and repair.

(1) Source: Reference (23).

(2) The 1980 figures are estimates based on the revised plan of 1980.

averaged approximately 14 percent of total construction output in the 1960's (85). Our figures show that the importance of maintenance declined steadily, falling from 14 percent in 1960/61 to only 5.1 percent in 1980. Even if it is assumed that the price of maintenance has increased at a lower rate than the price of new construction, it can still be seen that in Egypt the government has preferred to direct resources to horizontal expansion rather than to the maintenance of previous investments.

This policy, in addition to depleting the production and service sectors, impedes government plans. New government projects are interrupted and emergency projects must be launched, as in 1966 when the Cairo sewage system had to be revamped, because most of the streets were flooded with sewerage water. Such actions pose problems with regard to meeting the demand for construction in the economy, as they add an unexpected burden to the contractors who have to stop work on ongoing projects during such emergencies. Defaulting on maintenance is a national phenomena. For example, cement production in the mid-1970's, a time when cement consumption was growing steadily, dropped some 500,000 tons because of lack of maintenance at production plants, thus contributing to the current bottleneck and price increases.

2.2 NATURE OF CONSTRUCTION DEMAND IN EGYPT

Because construction's contribution to the economy is tied to capital formation, studying the fixed capital investment (FCI) will reveal the demand fulfilled by the sector. Table 2.6 shows the development pattern of FCI in the economy. Between 1960/61 and 1978 FCI grew considerably in current terms, some LE 2,290 million. The table

Table 2.6

Fixed Capital Investment and its Distribution Among Sectors

Values in LE Million

| Fiscal Year | Land | | Industry | | Transport | | Public Utility | | Housing | | Other Building | | Total | | Construction Component |
|----------------------|-------|----|----------|----|-----------|----|----------------|----|---------|----|----------------|----|--------|-----|------------------------|
| | Value | % | Value | % | Value | % | Value | % | Value | % | Value | % | Value | % | in FCI % |
| 1960/61 ¹ | 38.2 | 17 | 67.8 | 30 | 74.8 | 33 | 13.3 | 6 | 19.1 | 9 | 12.4 | 6 | 225.6 | 100 | 42 |
| 1961/62 ¹ | 51.9 | 21 | 50.3 | 20 | 71.2 | 28 | 16.5 | 7 | 37.6 | 15 | 23.4 | 9 | 251.1 | 100 | 50 |
| 1962/63 ¹ | 72.8 | 24 | 80.5 | 27 | 53.8 | 18 | 25.4 | 9 | 37.6 | 13 | 28.5 | 10 | 299.6 | 100 | 50 |
| 1963/64 ¹ | 102.1 | 27 | 105.4 | 28 | 45.1 | 12 | 43.8 | 12 | 37.4 | 12 | 38.6 | 10 | 373.4 | 100 | 51 |
| 1964/65 ¹ | 89.0 | 24 | 105.1 | 29 | 49.3 | 14 | 64.1 | 18 | 29.6 | 8 | 27.2 | 7 | 364.3 | 100 | 47 |
| 1965/66 ¹ | 82.3 | 21 | 107.4 | 28 | 53.1 | 14 | 74 | 19 | 42.5 | 13 | 20.0 | 5 | 383.8 | 100 | 47 |
| 1966/67 ¹ | 82.2 | 23 | 102.3 | 28 | 46.1 | 13 | 77.9 | 21 | 42.3 | 12 | 15.0 | 4 | 365.8 | 100 | 46 |
| 1967/68 ¹ | 67.5 | 21 | 86.8 | 29 | 38.3 | 13 | 57.1 | 19 | 40.7 | 14 | 11.6 | 4 | 298.0 | 100 | 49 |
| 1968/69 ¹ | 67.5 | 20 | 104 | 30 | 69.5 | 20 | 37.7 | 11 | 46.8 | 14 | 18.5 | 5 | 343.5 | 100 | 51 |
| 1969/70 ¹ | 61.3 | 17 | 126.5 | 36 | 71.4 | 20 | 38.2 | 11 | 36.5 | 10 | 21.6 | 6 | 355.5 | 100 | 50 |
| 1970/71 ¹ | 53.3 | 15 | 134.6 | 37 | 81.2 | 23 | 39.9 | 11 | 26.5 | 7 | 25.5 | 7 | 361.0 | 100 | 46 |
| 1971/72 ¹ | 44.0 | 12 | 166.7 | 43 | 79.6 | 21 | 38.3 | 10 | 17.0 | 4 | 25.6 | 7 | 384.0 | 100 | 43 |
| 1972 ¹ | 55.1 | 13 | 158.4 | 39 | 75.6 | 18 | 41.7 | 10 | 15.9 | 4 | 37.4 | 9 | 410.1 | 100 | 47 |
| 1973 ¹ | 60.1 | 13 | 169.0 | 36 | 122.0 | 26 | 49.6 | 11 | 19.4 | 4 | 35.6 | 8 | 472.1 | 100 | 42 |
| 1974 ¹ | 54.2 | 8 | 244.6 | 38 | 187 | 29 | 58.7 | 9 | 28.7 | 4 | 49.1 | 8 | 645.1 | 100 | 38 |
| 1975 ¹ | 89.8 | 8 | 321.2 | 28 | 373 | 33 | 91.4 | 8 | 37.4 | 3 | 79.3 | 7 | 1133.4 | 100 | 43 |
| 1976 ¹ | 94.8 | 7 | 579.2 | 41 | 406.1 | 29 | 104.4 | 7 | 45.0 | 3 | 92.5 | 7 | 1403.5 | 100 | 45 |
| 1977 ¹ | 120.7 | 9 | 419.3 | 30 | 415.6 | 29 | 156.9 | 11 | 66 | 5 | 139.8 | 10 | 1146.6 | 100 | N/A |
| 1977 ² | 139 | 8 | 788 | 43 | 442 | 24 | 167 | 9 | 176 | 10 | 128 | 7 | 1840 | 100 | 43 |

¹Source: Reference (22).²Source: Reference (62).¹The sectors in the aggregation of the economic sectors used by the Ministry of Planning are as follows:

Land: Agriculture, Irrigation and the High Dam

Industry: Industry and Mining, Petroleum, Construction

Transport: Transportation and Construction, Storage and The Suez Canal

Public Utility: Public Utilities, Electricity

Housing: Housing

Other Building: Commerce and Finance, Securities

also shows the development of the construction components of FCI.

2.2.1 Fluctuations in Fixed Capital Investment

In 1960/61, as the first Five-Year Plan was being launched, investment grew rapidly, at a rate of about 20 percent annually. In 1963/64 it had reached a peak of almost double its 1959/60 level. With the industrialization plan, land reclamation projects, and the Aswan high dam, demand on the construction sector boomed, and the construction component absorbed about 50 percent of FCI. In the following years, this share declined, reaching its lowest level in 1967/68. This decline can be attributed to an increase in military spending due to Egypt's involvement in the "Yemen" War in 1964 and the June, 1967 war with Israel. Defense expenditures continued to increase, and FCI fell to LE 290 million in 1967/68.

For the remainder of the 1960's and through the early 1970's, fixed investment almost stagnated, probably constrained by the continuation of high military spending. The decline in FCI that started in the mid-1960's affected the demand for construction somewhat differently in the early 1960's than in the late 1960's. The Yemen War, which was fought on foreign territory, constrained the economy, including construction, as a whole, and the construction component of the FCI declined slightly, to about 47 percent. The continued decline, due to the 1967 War, on the other hand, did not decrease the effective demand for construction in the economy because the construction component of FCI rose once more to about 50 percent.

The steady decline, however, in FCI in the early part of the seventies did constrain effective demand for construction; and in 1974,

the construction component's share dropped to only 30 percent. In 1974 however, the growth rate again picked up at a very high rate of almost 60 percent with efforts at reconstruction of the war damaged Suez Canal area, and FCI realized a jump of over LE 600 million in 1975. As the efforts at reconstruction picked up momentum and previously reclaimed lands were brought into cultivation, construction's share increased again to about 45 percent of FCI.

2.2.2 Sectoral Distribution of Investment

Table 2.6 also traces the distribution of FCI by economic sector over the past three decades. Past government policy has been to emphasize the commodity sectors of the economy over the service sectors.* Because the construction component of sectoral FCI differs greatly among the various sectors, shifting investments from one sector to another alters the overall construction component in total overall investment. Table 2.7 shows that in the housing sector, for example, construction accounts for some 90 percent of FCI while in the industry and electricity sectors it averages around 35 percent. In agriculture and irrigation, it ranges from 42 percent to 68 percent, while in the construction sector itself the construction component averaged only 6 percent.

The difference among sectors of the economy stems from the different use of FCI in each sector. While, in construction, fixed

* The commodity sectors include: industry and mining; agriculture and irrigation; transport and communication; and electricity. The service sectors include: public utilities; housing; construction; finance and trade; and social services.

Table 2.7

Construction Component in Fixed Capital Investment
of Some Economic Sectors (Percent of Total)

Source: Reference (2)

| Sector Year | Agriculture and Irrigation | Industry and Mining | Housing | Construction |
|----------------|----------------------------------|---------------------------|---------|--------------|
| 1960/61 | 61.8 | 23.0 | 88.0 | 00.0 |
| 1961/62 | 68.3 | 30.6 | 83.3 | 00.0 |
| 1962/63 | 62.7 | 31.7 | 89.6 | 00.0 |
| 1963/64 | 61.2 | 22.2 | 94.9 | 00.0 |
| 1964/65 | 53.6 | 30.4 | 94.0 | 00.0 |
| 1965/66 | 55.3 | 25.7 | 96.8 | 10.3 |
| 1966/67 | 49.0 | 30.5 | 93.6 | 02.6 |
| 1967/68 | 51.0 | 30.4 | 90.7 | 00.0 |
| 1968/69 | 54.2 | 25.0 | 90.6 | 09.5 |
| 1969/70 | 57.6 | 38.2 | 97.8 | 00.0 |
| 1970/71 | 45.6 | 40.1 | 90.6 | 01.1 |
| 1971/72 | 46.6 | 30.5 | 93.7 | 01.8 |
| 1972 | 53.0 | 46.4 | 98.8 | 01.8 |
| 1973 | 41.9 | 50.1 | 92.7 | 04.0 |
| 1974 | 61.8 | 32.3 | 97.0 | 06.6 |
| 1975 | 57.8 | 32.3 | 98.2 | 08.0 |
| 1976 | 63.2 | 45.0 | 92.5 | 12.3 |

capital is directed primarily towards the purchase of equipment, in housing it is directed for the most part towards the building of houses and utilities. In agriculture, irrigation and industry, the use of fixed capital is more evenly distributed between construction and machinery. Because industry is more mechanized, machinery claims a larger portion than in the former two. Changes in allocation of FCI within individual sectors also affects demand for types of construction.

2.3 DEMAND FORECASTS

Based on the previous characteristics of Egyptian construction demand, and given the government's future plans, construction demand in monetary terms can be forecasted. This section will summarize the effort of the Construction Industry Study, (Reference 22), to estimate probable construction demand using 1979 output as a basis for future forecasts. It analyzes the needs of the major sectors of the economy given the government 1980-84 Five-Year Plan. Finally, it investigates the macro-economic considerations as well as the capacity of the industry before it estimates construction demand in 1979 constant prices.

2.3.1 Construction Output in 1979

According to several sources, official output figures for construction are not reliable, and tend to underestimate actual output (23, 31). Not only do official figures ignore the informal sector's contribution to output, but as is evident from cement consumption in the mid-seventies, they also underestimate industry output (10).

Taking this into account, the unofficial estimated output of construction in 1979 has been adjusted to LE 1500 million compared to

the official output of LE 1110 million. LE 150 million of this 400 million difference has been attributed to the informal sector. The 250 million adjustment has been estimated by Reference 21 together with the Ministry of Planning. The distribution of the adjusted output on the major economic sector groups is shown in Table 2.8.

2.3.2 1980-1984 Government Plans

The 1980-1984 Government Plan is a strategic document which sets forth the increase in output the government hopes to achieve. It estimates target GNP and construction output, as shown in Table 2.9. The Five-Year Plan does not always include the yearly breakdown of sectoral investments, or even detailed information on the projects being undertaken during the plan period. The Five-Year Plan is usually supplemented by yearly plans that provide a sectoral breakdown of investment and provide a list of projects to be funded for the year, as is shown for 1979 and 1980 in Table 2.9.

Egyptian government estimates have traditionally been a poor predictor of what the likely output of the construction industry will be. Even when the plans include established targets for construction, it is not clear whether these targets take into account actual project needs or industry capacity, nor what prices are used in preparing the plans. More importantly, the government does not always adhere to its plans.

It is not surprising, then, to find considerable differences between estimates of expected construction output included in the plan and those revised and calculated by other means as shown also in Table 2.9. Construction output, estimated by the construction industry study

Table 2.8
 Estimated Output of Construction in 1979 by Sector
 (LE Million 1979 Prices)

Source: Reference (22)

| Sector | Output |
|------------------------|--------|
| Land | 119 |
| Industry | 137 |
| of which: | |
| Industry and mining | 127 |
| Petroleum | 9 |
| Construction | 1 |
| Transport | 260 |
| Public Utilities | 209 |
| of which: | |
| Electricity | 56 |
| Other | 153 |
| Housing | 189 |
| Informal sector | 150 |
| Building | 116 |
| | 1180 |
| Maintenance | 70 |
| Unallocated Adjustment | 250 |
| Overall Total | 1500 |

Note: For definition of sector, see Table 2.6.

TABLE 2.9

Summary of 1980-84 Five Year Plan

Source: Reference (22), (38)

LE Million, 1979 prices

| | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1980-84 | | |
|----------------------------------------------------|--------|--------|--------|--------|--------|--------|---------|--------|---------|
| | | | | | | | Total | Public | Private |
| GNP Five Year Plan | 12,550 | 14,765 | 16,117 | 17,578 | 19,265 | 21,153 | 101,428 | N.A. | N.A. |
| Construction Output: | | | | | | | | | |
| Five year plan | 1,100 | 1,543 | 1,590 | 1,689 | 1,813 | 1,955 | 9,690 | N.A. | N.A. |
| Revised plan | 1,100 | 1,543 | 1,700 | 2,000 | 2,300 | 2,700 | 11,343 | | |
| Most likely ^(d) | 1,500 | 1,693 | 1,690 | 1,789 | 1,913 | 2,055 | 10,640 | N.A. | N.A. |
| Total net investments ^(b) | 2,570 | 3,567 | 4,008 | 4,413 | 4,842 | 5,320 | 22,155 | 18,280 | 3,875 |
| Sectoral distribution of investment ^(c) | | | | | | | | | |
| Agriculture | 439 | 537 | N.A. | N.A. | N.A. | N.A. | 4,375 | 3,600 | 775 |
| Housing & Utilities | 378 | 446 | N.A. | N.A. | N.A. | N.A. | 4,630 | 2,880 | 1,750 |
| Transport | 450 | 480 | N.A. | N.A. | N.A. | N.A. | 3,250 | 3,000 | 250 |
| Industry | 284 | 351 | N.A. | N.A. | N.A. | N.A. | 2,500 | 2,000 | 500 |
| Tourism, Petrol & Suez | 402 | 409 | N.A. | N.A. | N.A. | N.A. | 2,100 | 1,800 | 300 |
| Social Services | 202 | 260 | N.A. | N.A. | N.A. | N.A. | 1,600 | 1,600 | - |
| Electricity | 208 | 278 | N.A. | N.A. | N.A. | N.A. | 1,500 | 1,500 | - |
| Development & New Construction | 126 | 140 | N.A. | N.A. | N.A. | N.A. | 1,200 | 900 | 300 |
| Local Government | 72 | 174 | N.A. | N.A. | N.A. | N.A. | 1,000 | 1,000 | - |

Notes: (a) includes the LE 250 Million adjusted by Reference (22).

(b) Source: Reference (38)

(c) 1979, 1980 distribution only for public sector investments, from Reference (38).

(d) Source: Table 2.19

(Reference 22) based on an analysis of the sectoral needs and the constraints on meeting these demands, differs from that included in the Five-Year Plan and its revision. The estimates, assuming they are calculated in 1979 prices, are based on continued growth of the industry's output at an average rate of about 16 percent per year from LE 1,100 million in 1979 to LE 1,955 million in 1984. The other estimate allows the construction industry's output to adjust to changes aimed at improving its efficiency and thus expects the output to be growing at a more conservative average rate of some 6.7 percent per year from LE 1,500 million in 1979 to LE 2,005 million in 1984. Given the unreliability of government plans, a better assessment of future industry demand would be reached by considering individual sectoral needs.

2.3.3 Sectoral Considerations

The estimate of construction output based on the preliminary sectoral analysis up to the year 2000 is summarized in Table 2.10. The analysis has considered the 1979 and 1980 values as given from the government budgets; the 1981 values, in general, are about 12 percent above the 1980 figures. The table indicates overall construction demand increasing at an average of 9.0 percent per year from 1981 to 1984. The rate then slows to 7.6 percent in the next five years, and to only 5.0 percent per year between 1989 and 1994. Furthermore, the industry's output seems to still be almost evenly distributed between the commodity and service sectors of the economy. Although the rate of growth of output for both groups is also very similar, the service sector is allowed to grow faster between 1984 and 1989.

2.3.3.1 Land (Agriculture and Irrigation)

The Five-Year Plan gave this sector top priority in investments. The plan expected to allocate LE 4,375 million or about 20 percent of the LE 22,155 million of total fixed investment to this sector. Construction output in 1979 was valued at LE 119 million, for 1980 the planned figure was LE 160 million. For the Five-Year Plan, total investment would grow by 49 percent between 1980 and 1984, while construction output would grow by 27 percent, implying a construction investment to total investment ratio of about 55.1 percent. If we assume this ratio holds for the sector under consideration, we can see that since investment to the sector was expected to grow by 75 percent in that period, construction output would be growing at about 40 percent between 1980 and 1984.

Because maintenance and repair has been accorded a higher priority in this plan after years of neglect, a growth rate of 10 percent per annum for new work plus 30 percent of the program for repair and maintenance would be considered quite reasonable, with an emphasis on repair in the early years. This is why in the preliminary figures in Table 2.10 for land, the demand was expected to double between 1981 and 1986, and then the growth rate was reduced. The growth from 1981 to 1986 was smoothed, growing at 21 percent from 1981 to 1982, then by 18 percent from 1983 to 1984, 15 percent for the following two years. The growth rate continues to increase at a lower rate, growing at an average of 10 percent between 1986 and 1994 and at five percent between 1994 and 2000.

TABLE 2.10

Preliminary Sector Analysis of Demand

Source: Reference (22)

| | 1971 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1992 | 1994 | 1996 | 1998 | 2000 |
|-------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|------|------|
| <u>GROUP 1</u> | | | | | | | | | | | | | | | | | |
| Land | 119 | 160 | 176 | 214 | 252 | 291 | 329 | 368 | 406 | 442 | 278 | 511 | 569 | 627 | 692 | 763 | 841 |
| Industry of which: | | | | | | | | | | | | | | | | | |
| (a)Industry | 127 | 190 | 209 | 230 | 253 | 278 | 306 | 337 | 370 | 407 | 448 | 492 | 596 | 722 | 873 | 1056 | 1278 |
| (b)Petroleum | 9 | 17 | 19 | 22 | 26 | 30 | 34 | 40 | 46 | 54 | 62 | 72 | 97 | 124 | 150 | 182 | 220 |
| Transport | 260 | 336 | 369 | 383 | 399 | 415 | 432 | 449 | 467 | 486 | 505 | 525 | 557 | 591 | 627 | 665 | 706 |
| Electricity | 56 | 92 | 101 | 108 | 115 | 125 | 137 | 145 | 157 | 170 | 184 | 204 | 249 | 302 | 341 | 378 | 419 |
| (c)Contracting | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 |
| GROUP 1 TOTAL | 572 | 796 | 875 | 958 | 1042 | 1141 | 1240 | 1341 | 1448 | 1566 | 1680 | 1807 | 2071 | 2370 | 2687 | 3048 | 3468 |
| <u>GROUP 2</u> | | | | | | | | | | | | | | | | | |
| Housing | 189 | 318 | 532 | 554 | 582 | 613 | 643 | 670 | 707 | 736 | 774 | 812 | 885 | 1108 | 10645 | 1156 | 1253 |
| Informal sector ^a | 150 | 169 | | | | | | | | | | | | | | | |
| Other Buildings | 116 | 169 | 160 | 150 | 140 | 130 | 130 | 130 | 130 | 130 | 130 | 142 | 169 | 200 | 238 | 283 | 336 |
| Public Utilities (other than electricity) | 153 | 182 | 218 | 262 | 314 | 377 | 430 | 490 | 559 | 637 | 725 | 725 | 725 | 725 | 725 | 725 | 725 |
| TOTAL GROUP 2 | 608 | 819 | 910 | 966 | 1036 | 1120 | 1203 | 1290 | 1396 | 1503 | 1629 | 1679 | 1779 | 2033 | 2027 | 2164 | 2314 |

TABLE 2.10 (continued)

Preliminary Sector Analysis of Demand

Source: Reference (22)

| | 1971 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1992 | 1994 | 1996 | 1998 | 2000 |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Maintenance ^b | 70 | 78 | | | | | | | | | | | | | | | |
| Adjustment ^c | 250 | | | | | | | | | | | | | | | | |
| GRAND TOTAL | 1500 | 1693 | 1785 | 1924 | 2083 | 2261 | 2443 | 2631 | 2844 | 3065 | 3309 | 3486 | 3850 | 4403 | 4714 | 5212 | 5782 |

Notes: ^aFrom 1981 on an allowance of LE 38 Million is made for informal rural housing. In 1979, 1980 the values of 150, 169 include all informal construction.

^bFigure includes installation of equipment. After 1980 the figure is included in each sector.

^cThe figure has been agreed with the Ministry of Planning informally.

Using the LE 6000 million, the assumed 25 percent construction component and a growth of 10 percent yields an output of LE 150 million. This is below the 1980 plan of 190 million, but above the actual 1979 level of 127 million which gives us confidence in the model. Because the model does not provide for economies of scale or learning factors, it was expected that the values estimated from it would overstate the demand slightly. This has been rectified by taking the values corresponding to an 8 percent per year GDP growth rate as the most likely, and not the 9 and 10 percent assumed in the Five-Year Plan. It is these figures with industry growing at 10 percent that are presented in Table 2.10 above.

2.3.3.2 Petroleum

In the Five-Year Plan, investments in the petroleum sectors are combined with those of tourism and the Suez Canal, and no separate estimate of investment in petroleum is available. The Plan does show, however, the anticipated output of the sector: output is expected to grow from LE 2,588 million in 1980 to LE 4,276 million in 1984, an average of 13.4 percent per year.

Investment in petroleum is determined by world prices and supplies, international and national politics, and balance of payment considerations. At least in the near future, investment in the sector can be expected to grow rapidly, at an estimated rate of 15 percent. Also, repair and maintenance of 5 percent are included in these figures. The maintenance ratio would increase by one percent per year up to 20 percent of total demand in 1994.

2.3.3.3 Industry and Mining

The forecasts for this sector were made by the use of a mathematical model based on the assumption that the amount of productive capacity necessary to enable industrial output to keep pace with domestic demand is closely related to the growth in population and income.

The output of manufactured goods could be given by a simple Cobb Douglas function:

$$O_t = A K_t^\alpha L_t^{1-\alpha} \quad (1)$$

where K_t = Stock of capital in the industry at time t
 L_t = Labor employed in it at time t
 O_t = Output
A and α are constants.

The consumption of manufactured goods is given by:

$$C_t = B Y_t^\beta P_t^\gamma \quad (2)$$

where Y_t = National income at time t
 P_t = Population at time t
B, β and γ are constants
 β = Income elasticity of consumption +ve
 γ = Population elasticity of consumption -ve

From (1) and (2) we can express the rates of growth of output and consumption from one time period to the next

$$\frac{O_{t+1}}{O_t} = O' = K'^\alpha L'^{1-\alpha}$$

$$\frac{C_{t+1}}{C_t} = C' = Y'^\beta P'^\gamma$$

If the growth rates are equal then

$$K^{\cdot\alpha} L^{\cdot 1-\alpha} = Y^{\cdot\beta} P^{\cdot\gamma} \quad (3)$$

If we assume that labor employed is a growing fraction of the population (m) then:

$$L^{\cdot} = m^{\cdot} P^{\cdot}$$

then:

$$K^{\cdot} = \frac{(Y^{\cdot})^{\beta/\alpha} (P^{\cdot})^{\gamma/\alpha}}{(m^{\cdot} P^{\cdot})^{1/\alpha-1}} \quad (4)$$

where α is the marginal efficiency of capital.

$$\text{Let } \beta/\alpha = k \text{ and } 1 + \frac{\gamma-1}{\alpha} = j.$$

They assumed that for Egypt $j = 0.6$

which meant that $j = -2.75$ and $k = 1.9375$ implying that $\beta = 1.1625$ and $\gamma = -1.25$. For Egypt it was also assumed that $P^{\cdot} = 1.025$ and $m^{\cdot} = 1.02$.

With these values it was possible to derive values of K^{\cdot} the growth rate of stock in buildings and equipment for various values of (Y^{\cdot}) growth of income.

To determine the growth rate of new construction we have to allow for depreciation. The study used 3 percent to depreciate existing and future construction. These growth rates are shown here in Table 2.11.

To use the model it was necessary to estimate a value for the stock of capital in the industrial sector, using investment figures from 1955 to 1979, adjusted for price changes and a 4 percent depreciation. The value of industrial assets in 1979 at 1979 prices was estimated at LE 6,000 million. Furthermore it was assumed that the construction component in the industrial sector investment was 25 percent.

TABLE 2.11

Growth Rates of GDP and Industry

Source: Reference (22)

| Growth Rate of GDP % | Net Rate of Growth of Stock % | Depreciation % | Growth Rate for New Construction % |
|----------------------------|-------------------------------------|-------------------|------------------------------------------|
| 7 | 5.12 | 3 | 8.12 |
| 8 | 7.04 | 3 | 10.04 |
| 9 | 8.96 | 3 | 11.96 |
| 10 | 10.91 | 3 | 13.91 |

2.3.3.4 Contracting

Since, the construction element represents a small portion of demand, this study has used a nominal figure of LE 1 million, which could grow to a maximum of LE 4 million by 1994.

2.3.3.5 Transport

The study first considered the roads construction program, including maintenance, upgrading of roads, new roads within settlements and inter-settlement roads. According to the plan, summarized in Table 2.12, a realistic moderately priced maintenance program would cost LE 844 per kilometer (km) for existing urban roads, and about LE 600 per km of upgraded urban roads. New urban roads would require an expenditure of LE 1000 per km because they are usually wider. Upgrading a road from unpaved to paved would cost LE 20,000 per km.

In Egypt, there are an estimated 8,500 km of paved urban roads and a similar length of unpaved roads (22). The target of the plan is to pave all unpaved roads in the 20 year period from 1983 to 2003, and to maintain adequately all paved roads. Paving costs will total LE 170 million, and maintenance will be an annual sum rising from LE 7 million. Paving should be done at an annual growth rate of 6 percent so as to defer its costs into the future. This annual cost is shown in column one of the table, while the maintenance costs in column two rise to take account of the growth rate of paved roads.

For inter-urban roads, the program is to maintain 12,336 kms of paved roads at a cost of LE 1,200 per km and to upgrade 14,183 kms of unpaved roads at an average cost of LE 35,000. With similar assumption about growth rates, they aimed at the figures in column three.

TABLE 2.12

Preliminary Statement of Desirable Road Program
(LE Million 1979 prices)

Source: Reference (22)

| | Urban Paving | Urban Maintenance | Inter Urban Upgrading & Maintenance | New Urban | New Inter Urban | Total |
|------|-----------------|----------------------|-------------------------------------------|--------------|--------------------|-------|
| 1983 | 4 | 7 | 28 | 100 | 41 | 180 |
| 1984 | 4 | 8 | 29 | 112 | 45 | 198 |
| 1985 | 5 | 8 | 31 | 114 | 49 | 207 |
| 1986 | 5 | 8 | 32 | 117 | 53 | 215 |
| 1987 | 5 | 8 | 34 | 120 | 58 | 225 |
| 1988 | 6 | 8 | 36 | 123 | 63 | 236 |
| 1989 | 6 | 8 | 37 | 126 | 67 | 244 |
| 1990 | 7 | 8 | 39 | 129 | 72 | 255 |
| 1991 | 7 | 8 | 41 | 133 | 77 | 266 |
| 1992 | 7 | 9 | 43 | 136 | 82 | 277 |
| 1993 | 8 | 9 | 46 | 139 | 87 | 289 |
| 1994 | 8 | 9 | 48 | 143 | 97 | 305 |
| 1995 | 8 | 10 | 51 | 146 | 107 | 322 |
| 1996 | 9 | 10 | 54 | 150 | 117 | 340 |
| 1997 | 10 | 10 | 56 | 154 | 129 | 360 |
| 1998 | 10 | 11 | 60 | 158 | 139 | 378 |
| 1999 | 11 | 11 | 63 | 162 | 150 | 397 |
| 2000 | 12 | 11 | 66 | 166 | 162 | 417 |

Roads within new settlements were assumed to grow at the rate of population increase of 2.5 percent per year. The costs in column four are arrived at using an average cost of LE 225,000 per km and a 1983 length of 425 km. It was felt that the need for inter-urban road building is not extensive at the present time. The program proposed, in column five, is based on a 1983 annual addition of 0.5 percent to the existing network. This addition is slowly raised to 1.0 percent by 1993 and growing by 0.1 percent per year after that. The average cost used was LE 300,000 per km.

These calculations did not take into account increased need arising out of present urban congestion or increased car ownership. Car usage in Egypt is artificially high because of gas subsidies. Congestion can be alleviated by better traffic management and a reduction in horse-drawn vehicles. Furthermore, fiscal measures (customs, taxes) may limit or reduce car ownership in the future.

The total cost of the road program in 1983 is LE 180 million, and rises to LE 417 million by the year 2000. On other items of the transport sector, information is limited. For 1983, allowance should be made for a rail program, greater Cairo garages, and the Cairo Metro. These amount to LE 12, LE 36 and LE 25 million consequently. Total transportation demand would then be LE 253 million.

To this we must add communications, docks and harbors, waterways, airport work, and the Suez Canal, for which an estimated LE 200 million per year would be required. This would put the desired output of the sector at over LE 450 million (LE 253 plus LE 200).

Any reduction should be in the road program in new and expanding urban areas. These could be constructed unpaved to save money. If the road program is reduced this will give a greater margin for the other items. In general the values in Table 2.10 represent an output growing at 4 percent per year from the 1981 output of LE 369 million and then slowing down to 3 percent by 1980. Maintenance should be about 20 percent.

2.3.3.6 Electricity

In 1976, per capita consumption of electricity was equal to 473 kilograms of coal (1040 lbs). The generating capacity was 3,994,000 kw. The Egyptian Electrical Authority plans to increase electrical generation by a factor of 6.3 between 1980 and 2000. Estimating income growth during this period averages 8 percent per annum, a factor of about 5, the generation plan is reasonable, given that a doubling of income normally results in a little more than a doubling of energy consumption.

The plan of the authority, described in its 1977 statistical report, has been adopted here. Costs have been calculated on the basis that power stations cost LE 6 million per 100 kw capacity. Generating plants cost about 55 percent of total investment. Twenty percent was added to the construction costs due to anticipated increased rural electrification and 10 percent for repairs and maintenance. The figures are shown in Table 2.10 growing at a rate of 9 percent from 1984 to 1989 and at 10 percent up to 1994 and slowing down to about 6 percent thereafter.

2.3.3.7 Housing

Demand for housing is slightly different from that for most other construction because housing is a final rather than an intermediate product. The need for housing in Egypt is and will continue to be great.

Forecasting demand is difficult because official current output figures do not include the informal sector which satisfies some demand. This study estimates its output in 1978 to be about LE 150 million. In the same year, formal sector output totalled LE 1,350 million.

Controversy also surrounds the figures that exist on housing shortages in Egypt. The National Housing Policy document quotes a shortage of 555,000 units in 1976 (22). The 1978-1982 Five-Year Plan cites a figure of 850,000 unit shortage in 1977. The 1976 census, on the other hand, reported 3,587,000 urban dwelling units and only 3,240,000 urban households (Table 2.13), indicating a possible surplus of 339,000 units. High vacancy rates in 1976 (3 percent for flats and 4.75 percent for rooms) lend credence to the existence of such a surplus.

This surplus notwithstanding, housing problems are still evident. Some of the existing stock is of very poor quality. For instance, it was estimated that about 900,000 units were built before the year 1900. Furthermore there is a growing need for replacing rooms with flats. This means that an adequate housing program has to make provisions for replacement and quality improvement.

TABLE 2.13

Dwelling Units in Urban Egypt 1976
(Thousand Units)

Source: Reference (22)

| Use | Flats | Rooms | Total |
|-----------------|-------------|------------|-------------|
| Private Housing | 2719 | 672 | 3391 |
| Work | 38 | 22 | 60 |
| Both Purposes | 10 | 5 | 15 |
| Empty | 86 | 35 | 121 |
| Total | 2853 | 734 | 3587 |

Note: Totals may not sum due to rounding.

More specifically, the program should provide units for new households that demographically concentrate in urban areas. Currently, the population is increasing at 1,200,000 per annum. This implies 203,000 new households per year of which 107,000 are urban. These are expected to grow at the average rate of 2.5 percent per year as indicated in column (a) in Table 2.14. In addition, the program has to accommodate increased urbanization due to migration, assumed to be 10 percent of the new households as shown in column (b). Finally, the program has to provide for the replacement and quality improvement in the housing stock, about 18 percent of all new need, as shown in column (c).

The costs of this urban housing program are calculated in Table 2.15, based on three standards of housing: medium (LE 4,500 per unit); Economic (LE 2,500 per unit); and lowest (LE 1,250 per unit). Total cost also includes the maintenance program consisting of an annual expenditure of 1.5 percent for old stock and somewhat less for new housing, based on a replacement cost of LE 2,500 per dwelling, and adding up to about 30 percent of the units at that cost.

Based on the costs of construction, it was considered most feasible to begin in 1981 at the economic standard, and then gradually raise the standard as time went on. The most likely output column was constructed using a 5 percent per year improvement to the medium standard starting in 1982. An allowance of some LE 38 million per year has been added to these figures to account for the rural informal sector; these figures are shown in Table 2.10.

TABLE 2.14

Urban Dwellings Required 1980-2000
(thousand units)

Source: Reference (22)

| Year | (a) New Households | (b) Urbanization (10 percent of (a)) | (c) Replacement of Inadequate Units* | Total |
|------|--------------------------|-----------------------------------------------|-----------------------------------------------|-------|
| 1980 | 107 | 11 | 78 | 136 |
| 1981 | 110 | 11 | 22 | 143 |
| 1982 | 112 | 11 | 22 | 145 |
| 1983 | 115 | 12 | 23 | 149 |
| 1984 | 118 | 12 | 23 | 153 |
| 1985 | 121 | 12 | 24 | 157 |
| 1986 | 124 | 12 | 24 | 160 |
| 1987 | 127 | 13 | 25 | 165 |
| 1988 | 130 | 13 | 25 | 168 |
| 1989 | 134 | 13 | 26 | 173 |
| 1990 | 137 | 14 | 27 | 178 |
| 1991 | 140 | 14 | 28 | 182 |
| 1992 | 144 | 14 | 28 | 186 |
| 1993 | 148 | 15 | 29 | 192 |
| 1994 | 151 | 15 | 30 | 196 |
| 1995 | 155 | 16 | 31 | 202 |
| 1996 | 159 | 16 | 32 | 207 |
| 1997 | 163 | 16 | 32 | 212 |
| 1998 | 167 | 17 | 33 | 217 |
| 1999 | 171 | 17 | 34 | 222 |
| 2000 | 175 | 18 | 34 | 227 |

*This figure is only 15 percent of (a) + (b).

TABLE 2.15

Total Cost of Urban Housing Program
Including Maintenance at Three Standards
(LE Million)

Source: Reference (22)

| Year | Medium Standard Average Unit Cost LE 4,500 | | Economic Standard Average Unit Cost LE 2,500 | | Lowest Standard Average Unit Cost LE 1,250 | | Provision for Maintenance ⁽³⁾ | Most Likely Output ⁽⁴⁾ |
|------|--------------------------------------------------|----------------------|----------------------------------------------------|----------------------|--------------------------------------------------|----------------------|------------------------------------------------|--------------------------------------|
| | New ⁽¹⁾ | Total ⁽²⁾ | New ⁽¹⁾ | Total ⁽²⁾ | New ⁽¹⁾ | Total ⁽²⁾ | | |
| 1980 | 612 | 742 | 340 | 470 | 170 | 300 | 130 | 470 |
| 1881 | 644 | 780 | 358 | 494 | 179 | 315 | 136 | 494 |
| 1982 | 653 | 791 | 363 | 501 | 181 | 319 | 138 | 516 |
| 1983 | 671 | 812 | 373 | 514 | 186 | 327 | 142 | 544 |
| 1984 | 689 | 835 | 383 | 529 | 191 | 337 | 146 | 575 |
| 1985 | 707 | 856 | 393 | 542 | 196 | 345 | 149 | 605 |
| 1986 | 720 | 872 | 400 | 552 | 200 | 352 | 152 | 632 |
| 1987 | 743 | 900 | 413 | 570 | 206 | 363 | 157 | 669 |
| 1988 | 756 | 916 | 410 | 580 | 210 | 370 | 160 | 698 |
| 1989 | 779 | 944 | 433 | 598 | 216 | 379 | 165 | 736 |
| 1990 | 801 | 970 | 445 | 614 | 222 | 391 | 169 | 774 |
| 1991 | 819 | 992 | 455 | 628 | 228 | 401 | 173 | 810 |
| 1992 | 837 | 1014 | 465 | 642 | 233 | 410 | 177 | 847 |
| 1993 | 864 | 1046 | 480 | 662 | 240 | 422 | 182 | 892 |
| 1994 | 882 | 1068 | 490 | 676 | 245 | 431 | 186 | 931 |
| 1995 | 909 | 1101 | 505 | 697 | 253 | 445 | 192 | 908 |
| 1996 | 932 | 1129 | 518 | 715 | 259 | 456 | 197 | 1026 |
| 1997 | 954 | 1155 | 530 | 731 | 265 | 466 | 201 | 1070 |
| 1998 | 977 | 1183 | 543 | 749 | 271 | 477 | 206 | 1118 |
| 1999 | 999 | 1210 | 555 | 766 | 278 | 489 | 211 | 1166 |
| 2000 | 1022 | 1238 | 568 | 784 | 284 | 500 | 216 | 1215 |

(1) New Cost = Average cost of unit x total number of units from Table 2.14.

(2) Total = Cost of new + maintenance cost.

(3) Based on an expenditure of 15% for the stock at a replacement cost of LE 2,500.

(4) Equal to the economic standard through 1981. Standards are raised 5% per year thereafter.

2.3.3.8 Other Building

Existing standards on the requirements of other buildings, such as those quoted in the NHP document, understate the actual need, because they ignore hotels and other buildings in the main urban centers (34). Using the NHP standard, implying a cost of other building to be almost LE 400,000 per 1000 dwellings, and adding 35 percent of the program for maintenance, the cost of new urban buildings in 1980 comes to LE 75 million. This is low when compared to the output of buildings in 1978 of LE 116 million and the LE 169 million planned for 1980. Alternative sources of information therefore have to be considered in forecasting demand for other buildings.

It appears non-educational buildings in the Sadat-City Master Plan account for two-thirds of the total non-residential buildings, including 13 percent for health and social services, 16 percent for national and regional government offices, and 15 percent for commerce, retail and wholesale activities including hotels (22). We can anticipate that the overall building program should be approximately three times that of educational building. Taking into consideration the Education Ministry's program for new classrooms, Table 2.16, such an expectation is consistent with the expected output of 1980 of LE 169 million in other buildings. (LE 57 million x 3 = LE 171 million).

Taking into account other types of buildings, it is possible hotel construction during the 1980's may decrease due to over supply (23). To account for this possibility, the preliminary program for non-building shows a slight decline of 5 percent through 1982 and

TABLE 2.16

Ministry of Education Program of New Schools

Source: Reference (22)

| Year | Number of Classrooms | Total Cost Based on Classroom 75 m ² at LE 80/m ² , LE Million |
|------|----------------------|--------------------------------------------------------------------------------------------|
| 1980 | 9469 | 57 |
| 1981 | 9476 | 57 |
| 1982 | 8806 | 53 |
| 1983 | 9286 | 56 |
| 1984 | 8326 | 56 |

only a one percent growth in 1983 and 1984. Even beyond 1989 the growth is expected to be about 25 percent to accommodate population increase. This is also partly to reflect the policy of tight housing construction.

2.3.3.9 Public Utilities Other Than Electricity

The NHP estimates the provision and maintenance of new water and sewage plants will cost LE 1,240 per dwelling. The existing deficiency is estimated at LE 1,034 million in 1979 prices. If this deficiency is to be rectified during 1981-85, it would amount to LE 1,532 per dwelling (22).

For maintenance of the existing facilities, an allowance equivalent to the replacement of 2 percent of the utilities is made. If there is roughly 4 million units in 1980 at a replacement cost of LE 1290 per dwelling we have a total cost of LE 5,000 million. Two percent of that is LE 100 million per year. Over twenty years this is LE 2000 million. Distributing it pro rata over the entire 20 year period implies a cost of LE 61 million for the 110,000 units of the first year.

Combining this LE 61 million with the provision of new works $110,000 \times 1,240 = \text{LE } 142 \text{ million}$, and making good on the deficiency $110,000 \times 1,532 = \text{LE } 168$ yields a 1981 cost of LE 371 million in 1978 prices. Because we have allowed more than 110,000 units in our housing programs we should increase the demand for utilities. The costs were increased to LE 420 million. These desired demands are displayed in Table 2.17.

Because it is unlikely the output of the sector will expand 131 percent in one year, this increase has been smoothed. A 20

TABLE 2.17

Suggested Desired Demand for Public Utilities
(Excluding Electricity)

Source: Reference (22)

| Year | Demand LE M | Annual Rate of Change percent |
|--------------------|----------------|-------------------------------------|
| 1979 (est. output) | 153 | |
| 1980 (plan) | 182 | + 19 |
| 1981 | 420 | +131 |
| 1982 | 477 | + 14 |
| 1983 | 516 | + 8 |
| 1984 | 554 | + 7 |
| 1989 | 555 | + 0 |
| 1994 | 630 | + 2.6 |

percent per year growth rate was the maximum that could safely be imposed on the sector. The figures in Table 2.10 have been confined to a 20 percent per year growth all through 1984. This is then reduced to 14 percent per year until 1994, when output is expected to stabilize.

2.3.4 Constraints on Meeting the Desired Demands

2.3.4.1 Demand Limitations

The amount of construction the economy can afford depends on the rate of growth of GNP. The Five-Year Plan projects GNP to increase at approximately 10 percent per annum. This is probably too high a growth rate to be sustained; and, as mentioned above, 8 percent per annum is the average long-term rate for GNP growth. According to 1980 plan figures, construction output is 10.5 percent of GNP. This is considered a reasonable estimate of the relationship of construction and GNP. It is doubtful the economy can provide savings to increase construction beyond 10-12 percent of GNP, considering construction equals 40-50 percent of investment. Construction expenditure cannot be expected to grow faster than GNP. Currently, construction prices are increasing at a higher rate than average prices in the economy. If this continues, construction's share in GNP could grow beyond the planned-desired 10 percent. If prices are expected to remain high in the near future, it may be prudent policy to let construction grow at a lower rate than GNP to take account of high prices.

2.3.4.2 Capacity of the Industry

In the late seventies the industry experienced a "boom". The resource constraints were alleviated by imports and output was accelerating, as indicated by the 1979 upward revision of the

industry's output. Evidence from other parts of this study demonstrate the industry is operating inefficiently. If demand pressures continue, it is likely that costs and prices will continue to rise, preventing increases in real output. The industry has to aim for more efficient use of resources and lower real costs.

2.3.5 Recommended Levels of Output

Based on the above considerations and bolstered by the fact that any changes will take time before they manifest any effect on the industry (Construction Industry Study estimates 4 years after implementation), it is recommended to keep the growth rate of the industry's output up to 1984 or even 1985 below the growth rate of GNP. Six to seven percent is the range for this period. It can slightly increase between 1985 and 1989 but only to about 8 percent. Only after 1990 should industry's output be allowed to grow at a rate faster than GNP. This would indicate that the preliminary demand figures between 1982 and 1986 in Table 2.10 have to be revised.

Table 2.18 shows the recommended levels of output growing at lower rates up to 1989. The rate rises beyond 1989 at an average of 9 percent per year, which is much higher than the average 5.5 percent expected in Table 2.10. The service group is one that has been slowed down in the early years and is expected to catch up in later years. This reduction was arrived at by reducing the housing program initially and then increasing it substantially beyond 1989. Public utilities also have been brought into line with these new housing requirements. The commodities sector growth has been essentially maintained. Land has been only slightly modified. The increases in industry, transport, and

TABLE 2.13

RECOMMENDED LEVELS OF OUTPUT
Source: Reference (22)

| Sector | Est. 1979 LEm | 1980 LEm | Annual Percent change | 1981 LEm | Annual Percent change | 1982 LEm | Annual Percent change | 1983 LEm | Annual Percent change | 1984 LEm | Annual Percent change | 1989 LEm | Annual Percent change | 1994 LEm | Annual Percent change |
|---------------------------------------------|---------------------|-------------|-----------------------------|-------------|-----------------------------|-------------|-----------------------------|-------------|-----------------------------|-------------|-----------------------------|-------------|-----------------------------|-------------|-----------------------------|
| <u>Group 1</u> | | | | | | | | | | | | | | | |
| Land | 119 | 160 | - | 176 | +10 | 210 | +19 | 247 | +18 | 284 | +15 | 480 | +10.5 | 625 | +5.5 |
| Industry of Which: | | | | | | | | | | | | | | | |
| Industry & Mining | 127 | 190 | - | 209 | +10 | 230 | +10 | 253 | +10 | 279 | +10 | 450 | +10.0 | 720 | +10.0 |
| Petroleum | 9 | 17 | - | 19 | +12 | 22 | +16 | 26 | +18 | 30 | +15 | 60 | +14.9 | 125 | +15.6 |
| Construction | 1 | 1 | - | 1 | 0 | 1 | 0 | 2 | +100 | 2 | 0 | 3 | +8.3 | 4 | +5.9 |
| Transport | 260 | 336 | - | 369 | +10 | 383 | +4 | 399 | +4 | 415 | +4 | 505 | +4.0 | 590 | +3.2 |
| Public Utilities of Which: | | | | | | | | | | | | | | | |
| Electricity | 56 | 92 | - | 101 | +10 | 108 | +7 | 115 | +6 | 125 | +9 | 185 | +8.2 | 300 | +10.0 |
| Total Group 1 | 572 | 796 | - | 875 | +10 | 954 | +9 | 1042 | +9 | 1142 | +9 | 1635 | +7.4 | 2365 | +7.7 |
| <u>Group 2</u> | | | | | | | | | | | | | | | |
| Housing | 189 | 318 | -) | 445 | -5)) | 465 | +4)) | 496 | +7)) | 536 | +8)) | 800 | +8.3)) | 1300 | +10.2 |
| The Informal Sector b/ | 150 | 150 |) |) |) |) |) |) |) |) |) |) |) |) |) |
| Other Buildings | 116 | 169 | - | 160 | -5 | 150 | -5 | 140 | -7 | 130 | -7 | 130 | 0 | 200 | +9.0 |
| Public Utilities, other than Electricity | 153 | 182 | - | 210 | +10 | 220 | +5 | 235 | +7 | 254 | +8 | 400 | +9.5 | 695 | +11.0 |
| Total Group 2 | 608 | 819 | - | 815 | 0 | 835 | +8 | 871 | +4 | 920 | +6 | 1330 | +7.6 | 2195 | +10.5 |
| Maintenance c/ | 70 | 78 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Unallocated Adjustment d/ | 250 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Grand Total | 1500 | 1693 | +13 | 1690 | 0 | 1789 | +6 | 1913 | +6.9 | 2055 | +7.4 | 2965 | e/ | 4560 | +11.0 |

a/ All figures for 1989 and 1994 (except those with one digit only) have been rounded to the nearest LE Sm.

b/ See text. In 1979 and 1980, LE 150m allows for all informal construction, mostly housing.

c/ This figure includes installation of equipment; it is available for 1979 and 1980 but thereafter is included in the sector.

d/ This figure for 1979 agreed informally with Ministry of Planning.

e/ 7 percent 1984-86 and 8 percent 1986-89.

electricity all have been maintained at their original levels because they are necessary to achieve the growth of GNP. Throughout, the emphasis has been placed on maintenance and repair which in 1984 averaged about 23 percent of total construction compared with the historic 5 percent (22).

CHAPTER III

CHARACTERISTICS OF CONSTRUCTION SUPPLY

3.1 NATURE OF CONSTRUCTION INDUSTRY

The construction industry in Egypt, as elsewhere, may be viewed as that sector of the economy which transforms various resources into constructed facilities. These facilities range from residential, industrial, and commercial/institutional buildings to roads and other civil works projects, and play a critical and highly visible role in the process of development.

The typical participants in construction, portrayed in Figure 3.1, include architects, engineers, management consultants, general and specialty contractors and subcontractors, labor subcontractors, and construction workers, along with the owners, operators, and users of the constructed facility. Building finance and insurance agencies, other investors, and materials and equipment suppliers and manufacturers are also involved in construction. The government acts as a regulator and adjudicator. Numerous business, financial, and technical laws, regulations, decrees, and codes constitute the regulatory environment within which the construction industry operates.

The construction of a facility is a complex process involving various steps and participants. Each participant is generally from an independent organization, and may be selected on the basis of price and/or qualifications. Participants are gathered on a project-by-project basis with little or no provision for ensuring organizational compatibility and with little possibility for continuous working

FIGURE 3.1

MAJOR PARTICIPANTS AND STEPS IN CONVENTIONAL PROJECT
CONSTRUCTION, TOGETHER WITH MAJOR FUNCTIONS AND
ARRIVAL TIMES OF PARTICIPANTS

SOURCE: Reference (31)

| PARTICIPANT | LIFE CYCLE PHASE | | | |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| | CONCEPTION AND PLANNING | DESIGN | CONSTRUCTION | OPERATION AND MAINTENANCE |
| OWNER | Inputs: Analysis of Market/Needs, Analysis of Feasibility/Economics, Site Evaluation/Selection, etc. Outputs: Preliminary Studies, Schedules, Plans, Funds. (These activities may be delegated to consultants or be done by the participants.) | 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 | + | Inputs: Preliminary Studies, Alternatives, etc. Outputs: Plans, Specifications, Contract Documents. | Monitoring, Reviewing, Approving Progress and Changes. | Resolving Operating Problems, Modernization/Upgrading. |
| GENERAL CONTRACTOR, SUBCONTRACTOR, SUPPLIER | + * | + | Inputs: Resources, Management, Supplies, etc. Outputs: Physical Facility. | Deficiency Correction, Major Repairs, Alterations. |
| OPERATOR/USER | + | + | + | Inputs: Operation, Maintenance and Repair. Outputs: Operating Facility. |
| GOVERNMENT-LOCAL/CENTRAL | Inputs: Preliminary Studies, Plans. Outputs: Approval of Project for Plan. | Inputs: Designs, Specifications, Contract Documents. Outputs: Permits for Construction, Materials, Importing, etc. | | Inputs: Alterations, Specifications. Outputs: Permits. |

* Indicates participant has not yet entered the process.

relationships. Furthermore, each participant is generally brought into the project only when needed, which curtails feedback and new alternatives in the later stages of the project, and constrains participants to work within the bounds of decisions in which they had no part.

This chapter shall analyze the major participants of the Egyptian industry: the clients, professionals, contractors and suppliers. It shall describe the different types of firms in each category and then investigate their operation within the environment of the industry. The investigation of the contractual relations among the participants is covered in more detail in Chapter V, together with registration and taxation requirements in Egypt.

3.2 THE CLIENT SECTOR

Owners, planners, and investors form the client sector, which initiates and finances the construction project. Their task is to establish the need for a new facility, define facility requirements and budgetary constraints, and evaluate and select the site. If an owner does not have an in-house design team he must employ a designer to develop and a contractor to construct his facility. During the actual construction process, the client assesses and approves the other participants' activities, although some of these responsibilities may be delegated to the professionals on the project.

In Egypt, the client sector may be divided into three groups: the private, public, and government. The private sector specializes in residential and commercial/institutional building, although its contributions to industrial building have been on the rise since the

initiation of the Open-Door Policy in 1974. The public sector (enterprises with more than 50 percent government capital) focuses on industrial building; its activities in other building and nonbuilding are largely in support of industrial development. The government sector, which encompasses various ministries at the national and governorate levels, concentrates on commercial/institutional building and road and other civil works construction. The public and government sectors are often lumped together. Each alone is many times the size of the official private sector construction, with the public sector being the larger of the two.

3.2.1 Residential Building

If construction cost exceeds LE 5,000, a building permit is required. To obtain a building permit, the owner must present the title to the land and an estimate of construction costs to an approval committee in the local governorate. The permit and the complete drawings must be taken to a district office (seven in the Cairo Governorate) to obtain the building license. Approval is also required for other types of construction, rehabilitation, and addition work; the approval process takes about two months. As long as construction begins within the year, the contractor representing the owner can obtain the necessary regulated materials, with their release tied to the progression of the construction. The owner is then required by law to hire a certified engineer to supervise the execution of the building and to attest to its soundness (Law 106, 1976). Utilities are provided by the water, sewer, and electricity authorities, although the owner is responsible for the cost.

Residential building is the most important type of construction initiated by the private sector. Since 1961, the government has increased its role in housing construction, providing mostly low-income public housing. Housing investment is summarized in Table 3.1.

3.2.1.1 Private Sector Owners

Private sector owners fall into two categories: "formal" and "informal". The formal sector consists mainly of individuals, cooperative societies, and private companies. Informal housing construction is that executed without clear title to the land and without building permits. This type constitutes an estimated 50 percent of the residential construction in Cairo and other urban areas (21).

Commercial banks and other financial institutions in Egypt generally do not directly finance housing production for individual owners. Rather, they channel credit to the housing finance system through long-term loans to Crédit Foncier and the General Authority of Building and Housing Cooperative (GABHC) (28). The Crédit Foncier Egyptian, together with the new, small Arab Land Bank, are the main sources of long-term loans to individuals. Crédit Foncier's available mortgage credit has been restricted in recent years, though its management is beginning to adopt a somewhat more active and aggressive role.

Individuals may also organize as cooperative societies, according to their place of work (e.g., MOH), profession (e.g., doctors, engineers), location, and so forth. There are nine

TABLE 3.1

Distribution of Investment in Housing
Among the Various Participants in the 1978-82 Five-Year Plan

Source: Reference (37)

1978-82 Housing Investment (L.E. Million)

| | | |
|--------------------------|------------------------------------|--------|
| MOH: | Governorates | 360.0 |
| | Reconstruction Machinery Projects | 20.0 |
| | Housing Projects | 35.4 |
| | Other Affiliates | 11.2 |
| Total: | MOH | 426.6 |
| | Industry, Power, Services Councils | 68.4 |
| | New Cities | 90.0 |
| TOTAL: | Public Sector | 585.0 |
| | Private Sector | 457.0 |
| TOTAL HOUSING INVESTMENT | | 1042.0 |

hundred cooperatives in Egypt. Members purchasing low and middle-income housing are eligible for financing through the GABHC; those purchasing high-income housing must deal directly with commercial banks. GABHC provides loans for 90 percent of the purchase price for low-income housing and 80 percent for middle-income. In 1975 the repayment period was thirty years and the interest rate for these loans was three percent. GABHC obtains these funds from commercial banks and Crédit Foncier at an interest rate of 7 to 8 percent. The government subsidizes the difference and also pays GABHC's operating expenses. Loans in 1977 ranged from LE 1,500 to LE 5,000 per flat.

To qualify for GABHC financing, cooperatives must have at least thirty families and LE 300 in equity. The cooperative finds the land and hires an architect and/or engineer to design and supervise the construction, and a contractor to build the facility. GABHC oversees and approves these contracts at each step, and disburses the loans as the construction proceeds in order that the cooperative can make progress payments to the contractor.

Since the enactment of Law 43 in 1974, new forms of private residential development have begun to emerge, primarily in the luxury apartment market (28). A firm or project with joint venture status under Law 43 is exempt from taxes for five to eight years and is not subject to rent control. A 10,000 unit project in Cairo, sponsored by Arab Contractors, is one of the first housing projects to take advantage of these incentives. The project encourages foreign investors and non-resident Egyptians to purchase units in foreign currency through provision of certain reconversion rights; each investor, regardless of

nationality and currency, has joint venture status. Down payments for up to 25% are due before construction begins. Additional payments are expected during construction, which normally takes three to four years. For the luxury units, payment in full is expected before or upon completion, while for the semi-luxury units, ten-year, 7 percent mortgages for 50 percent of unit cost have been arranged through a commercial bank loan guaranteed by Arab Contractors.

Another firm, the Cairo Company, has devised a system of selling bonds before construction begins. The bonds are eventually applied to the purchase price of the flats; the amount of these bonds usually exceeds the contracted price. The principal is guaranteed by the Bank of Cairo, but both principal and interest (2 percent until application toward purchase) are the obligation of the building company acting as agent for the Cairo Company and trustee for the bond holders.

The informal system relies largely on individual savings, either singly or pooled with those of others, an arrangement called "gamiya". Land may be purchased with only a down payment, with the remaining balance perhaps being divided in equal installments over a period of up to twelve years. A fee of 10 to 20 percent may be charged to compensate the seller for his waiting time. The construction is typically traditional and executed gradually. Both construction and design are frequently performed by a small contractor, who might operate as a labor subcontractor in the larger construction industry. This contractor might also help finance the construction for as long as three years. Such financing is generally reflected in a mark-up in his price.

Alternatively, the construction might be carried out by laborers, paid on a piece-rate basis, with the owner directly supervising the process (31).

Maintenance of residential buildings is the responsibility of the owner. Maintenance of rental units is a serious problem because owners are reluctant to keep up their buildings in view of the small rents they collect under current rent control laws. Law 49 of 1977 increased rents and stipulated a portion of the rent be collected for depreciation and repair, but it is not clear whether these amounts are sufficient to transform landlords' attitudes toward maintenance.

3.2.1.2 Public Sector Builders and Owners

Public sector buildings and owners of residential buildings are of two basic types: public sector development companies, and public sector companies which provide housing as a secondary activity. The public sector development companies are supervised by the MOH. Some have a concession from the government for a particular piece of land, like the Nasr City, Heliopolis, Maadi, and El Maamoura Companies; others, including the El Shams Company for Housing and Development, Development and Popular Housing Company, and El Motahida Company for Housing and Development, are allowed to buy government land in urban areas for development purposes. These companies primarily provide condominiums for middle and upper-income families. Most of their financing derives from banks, insurance companies, land sales down-payments, and collections on projects (77).

The Nasr City Company well illustrates the operations of these developers. Established in 1959 as a developer, in 1975 it expanded its operations to include planning, design, and construction. All of its activity has been in Nasr City, of which 80 percent is housing, and the rest is administrative buildings. In some cases, the company may simply purchase land from the government, plan, contract, and supervise the installation of utilities and other infrastructure, and then sell the improved land. At other times, Nasr City Co. plans and designs the facilities, and contracts out the construction, and supervises its execution. Some of the company's recent activities have included the sale of one million square meters of improved land to MOH; joint efforts with GAHBC to build 1200 units; a joint venture with Kuwait-Egyptian Investment Company on a tourism project; and cooperation with Misr Reconstruction Company, a private developer, in building ten thousand units, with Nasr City Co. providing the land and infrastructure, and Misr Reconstruction Co. the financing. In its most recent expansion, Nasr City Co. began the construction of 4,000 units over the next three years. Construction is to be rather mechanized, using tunnel forms. Some LE 2 million has already been invested in construction equipment. The company was expected to add 200 employees, largely technical personnel and laborers, to its payroll of 500.

The trends toward diversification of investments and services exhibited by Nasr City Co. are typical of the public sector developer in Egypt today. Since the implementation of the Open-Door Policy and enactment of Law 43 of 1974, many developers have formed

joint ventures with Arab capital, and are using foreign contractors in project execution (31). For example, the Cairo Plaza office complex owner, the Misr Abu-Dhabi Development Company, is a joint venture with El Shams Development Company, and has retained Higgs and Hill as construction manager for the project.

The public sector companies which provide housing as a secondary activity are supervised by various ministries. The housing they build is largely for company employees and financed on a project-by-project basis, except for the small part of their profit reserves (15 percent earmarked for provision of services) that is administered by local authorities for extensions and maintenance (31). These public companies most often employ outside professionals and contractors for design and construction.

3.2.1.3 Government

The government provides housing through: (a) local governorates; (b) the allocation of reconstruction and development funds; (c) GABHC; and (d) government development companies.

Public housing for low- and middle-income families has been built largely by the MOH working through the Housing Administrations of the various governorates. Sixty to seventy percent of recent public housing budgets has been allocated to the governorates. Through the Local Government Law of 1975, the districts are charged with the specific responsibilities of:

- (1) implementing laws affecting land development, building permit administration, construction supervision, and rent control enforcement activities;

- (2) administering and supervising government services in their jurisdiction;
- (3) managing public utilities;
- (4) managing transportation networks; and
- (5) contracting for and supervising government projects in the district.

The local districts' lack of technical personnel and budget appropriations often necessitate centralized assistance in the study, planning, and execution of projects. Rents collected from public housing in the past have been too small to cover even maintenance costs.

The MOH and the Ministry of Development and New Communities have provided housing in the Suez Canal Zone and in the new cities, like Sadat City and Tenth of Ramadan. The Ministry's direct role in the provision of housing in the new towns appears to be rather small compared to that of the MOH governorate program in the Five-Year Plan. Only LE 90 million of LE 585 million allocated for public housing is slated for the new settlements, while LE 360 million is earmarked for the MOH's governorate programs (see Table 3.1).

GABHC has recently been increasing its activities as a full-scale developer. It has directed approximately half of its funds to cooperatives. In these cases it purchases the land for the government or a development company, plans and designs the facility, tenders the contract for construction, supervises the construction, and turns the completed flats over to the individual members of the cooperative who are usually identified during the construction process. To qualify, each family must have an income of at least four times the

monthly payment, and it can purchase only one cooperative property (with the exception of North Coast property). The cooperative is then formed and takes over the management/operation of the facility as in a regular cooperative, although GABHC and the bank continue to deal directly with the individual owners for payments on loans.

The Egyptian government is also involved in housing through the government development companies such as the Saudi-Egyptian Construction Company (SECON) and another with Kuwait. SECON is half financed by the government and half financed by Saudi Arabia. Formed in 1975 to operate as a developer, it plans to expand its operations to include contracting. Its projected investments include a mix of low and middle-income housing, some higher-income housing, office buildings, and hotels. All facilities will be sold upon if not before completion. The firm's first project is a community development project in Maadi consisting of 1,500 flats and some stores. The housing is intended for middle-income Egyptians who have been working abroad; Maadi Company for Housing and Development under MOH owns the land and installed the utilities. Using a foreign consultant to prepare terms of reference for the project on a design-construct basis, the project was put up for international tender and was awarded to the General Giza Contracting Company in a joint venture with Larsen-Nielsen from Denmark. In this project, as in others, SECON is self-financed through loans extended from the Saudi government, although bank loans are also possible.

3.2.2 Industrial Building

Industrial building in Egypt is dominated largely by public sector companies. The private sector's role is growing and is expected

to grow further with the continuation of the 1974 Open-Door Policy and the emphasis on private sector development in the new Five-Year Plan (see Table 3.2).

3.2.2.1 Private Sector Owners

Private sector owners are of two types, those relying on local financing and those benefiting from Law 43 of 1974 governing foreign investment in Egypt. Local industrial projects must be approved by the General Organization for Industrialization, while foreign investment projects require the approval of the General Authority for Arab and Foreign Investments and Free Zones. As is the case with residential building, permits/licenses are issued by the governorate, and require the involvement of the professional from the earliest stages through execution. Commercial banks serve as a major source of finance for industrial projects in Egypt. Capital in joint venture projects is provided by both local and foreign partners, which alleviates foreign currency problems, at least in the developmental stages, and leaves the joint venture firm free to seek out foreign consultants and contractors.

Industrial Engineering Company for Construction and Development (ICON), a new local developer of industrial facilities to produce materials and equipment for construction, is but one example of the type of firm taking advantage of Law 43. With 33 percent of the capital, it has entered into a joint venture, the Egyptian Aluminum Products Company (LE 2 million) with Reynolds International (20 percent), Arab Contractors (20 percent), Misr Aluminum Company (10 percent), and Misr-Iran development bank (17 percent). Misr Consultant

TABLE 3.2

Industrial Production and Investment and Their Distribution
Among the Public and Private Sectors.

Source: Reference (37) Vol. VI

| | Public | Private | Total |
|---------------------------|-----------------------|----------------------|----------------------|
| | (value in LE million) | | |
| 1975: | | | |
| Achieved Investment | 239.9 | 25.0 | 264.9 |
| Production (Market Price) | 2,183.2 ^a | 1,163.4 ^a | 3,346.6 ^a |
| Public/Private Shares (%) | | | |
| All Industry | 62% | 38% | 3,227.6 |
| Food | 48 | 52 | 1,383.3 |
| Spinning/Weaving | 66 | 34 | 766.6 |
| Chemical | 87 | 13 | 4,509.9 |
| Metallurgical | 73 | 27 | 255.3 |
| Engineering | 71 | 29 | 348.9 |
| Mining | 86 | 14 | 22.6 |
| 1978/82: | | | |
| Planned Investment | 2,706.6 | 709.0 | 3,411.6 |

^aIncludes unspecified production.

Engineers, a large Egyptian design firm, and the foreign partner in the project will design the factories. ICON, with a relatively large technical department, will assist in equipment selection. Arab Contractors will compete with other Egyptian contractors for construction. The major in-plant equipment will be imported from the country of the foreign partner; and at least in the initial production stages, the foreign partner will serve as production manager and supplier to the plant.

3.2.2.2 The Public Sector

The public sector has been, and continues to be, the main client in industrial development in Egypt through projects initiated under government planning and financed with funds from the budget and commercial banks. Local, private consultants design facilities in conjunction with equipment suppliers. In the past, public sector contractors and private subcontractors executed construction, though the private sector is expected to increase its participation given the recent return of competitive bidding. Supervision of construction is usually done by the staff of the public sector client in conjunction with the main consultant on the project. Finally, maintenance and repair as well as upgrading work is generally contracted out but supervised by the owner. As in the case of the private sector, public sector companies are also entering into joint venture arrangements with foreign firms to benefit from Law 43.

3.2.2.3 Government

Government provision of industrial construction is primarily limited to very large projects where new companies have yet to

be formed, such as the Iron and Steel Complex and the Aluminum Smelter authorities. Central government agencies fund and design these projects -- though the plans may also be subject to review by an outside consultant -- as well as supervise their construction. Construction is often contracted out to the public sector. Such central control is perceived as beneficial in the early stages of these large projects.

3.2.3 Commercial, Institutional, and other Building

The government is the principal client in this category of building, particularly in administrative and institutional facilities, while the private sector focuses on commercial and service buildings.

3.2.3.1 Private Sector Owners

Private sector owners have long been active in this area, and with the Open-Door Policy and Law 43, their involvement is expected to grow considerably in the near future. The number of firms engaged in commercial representation and commodities and equipment supply is increasing, and with this so too is the need for storage space and office buildings. With the growth in business in the large cities and the opportunities for investment offered under Law 43, private firms are beginning to build for tourism and business. Within the last three years, for example, at least a dozen first class hotels have been developed by private owners in Cairo alone. Up to 1981, the General Authority for Arab and Foreign Investments and Free Zones had approved 116 tourism projects and 177 investment companies (3). There exists a trend in Egypt now to use foreign consultants and contractors in these projects for their time-saving techniques. Financing is from both local and foreign sources. Hopefully, foreign influence and an increased

awareness of its value on the part of the Egyptians will focus attention on the maintenance of these structures.

3.2.3.2 Public Sector Owners

Public sector owners in this category of building consist of industrial and other companies who provide these facilities as a secondary activity, and public sector development companies discussed above. Recently, most companies have initiated projects falling under Law 43. El Shams Company for Housing and Development, for example, was involved in the Jollie Ville Hotel and a new office building on Abd-El Khalik Sarwat Street, while Egyptian General Hotels and Tourism Company is involved with the Intercontinental and Hyatt Regency Hotels. Other firms, such as the Mariout Agriculture Company, are also moving toward joint ventures with foreign concerns. A mix of local and foreign banks is often used to finance these projects.

3.2.3.3 Government

The government is typically the major client for administrative, health, educational, and social services buildings. Both public and private professionals design these structures. Public contractors were largely responsible for construction in the past; private contractors are now expected to compete with them. In the recent Five-Year Plan, investment in the education, health, and security and justice sectors, is geared toward completing ongoing construction and erecting new buildings. Maintenance of many of these buildings has often been inadequate. The Five-Year Plan is encouraging in that it is oriented toward raising the productive capacity of existing facilities before expanding horizontally to new ones.

3.2.4 Roads and Other Civil Works Construction

Nonbuilding construction is dominated by the government sector which develops, operates, and maintains agricultural, land reclamation, irrigation, road, bridge, railway, telecommunications, airport, and energy projects. Public and private sector clients play a minor role in such projects, even in agriculture where more land is held privately than by the government; their involvement is usually in the form of support activities to their primary commercial, industrial, or residential activities. Planned investment in various civil works projects by these three categories of clients over the five years 1978-82 is given in Table 3.3.

3.2.4.1 Private and Public Sector Owners

Private and public sector owners in nonbuilding construction have been, and continue to be, concentrated largely in agriculture and land reclamation. When Law 43 was enacted, public sector land reclamation firms began to enter into joint ventures. Examples are the Ismailia Misr Agriculture established in 1977 to reclaim land in Wadi El Mollak, and the Egypt Aswan Fishing Co. in Aswan, to develop fish in Lake Nasser. The private sector is also becoming involved in this as evidenced by Tymos Agriculture Co. which is involved in the growth of seedlings, and ten or so poultry projects executed since 1974.

Much of the remainder of private and public nonbuilding construction is in the form of support activities, especially connections to main lines for utilities and electricity. Industrial owners occasionally build auxiliary generators, purification

TABLE 3.3
Distribution of Planned Investment
in Various Civil Works Projects
During 1978-82 Among the Government,
Public and Private Sector Clients
Source: Reference (37)

(Values in LE Million)

| | Government | Public Sector | Private Sector | Total |
|------------------------------------------------------|--------------------------|------------------|--------------------|---------------|
| <u>Agriculture, Land Reclamation and Irrigation:</u> | | | | |
| Agriculture | 34.9 | 57.3 | 64.0 | 156.0 |
| Land Reclamation | - | 247.4 | 60.00 | 307.4 |
| Water Wealth Projects | 46.9 | 19.4 | - | 66.3 |
| Irrigation and Drainage | <u>444.5</u> | <u>10.0</u> | - | <u>454.0</u> |
| Sub-Total | 526.3 | 334.1 | 124.0 ^a | 938.9 |
| <u>Utilities:</u> | | | | |
| Drinking Water | 309.5 | - | - | 309.5 |
| Sanitary Disposal | 279.9 | - | - | 279.9 |
| Other Works | 56.0 | - | - | 56.0 |
| Estimated Other Investments ^b | 147.0 | - | - | 147.0 |
| Sub-Total | <u>794.4</u> | - | - | <u>794.4</u> |
| <u>Transportation and Communication:</u> | | | | |
| Railroads | 240.2 | - | - | 240.2 |
| Roads & Waterways | 464.4 | - | - | 464.4 |
| Telecommunications & Broadcasting | 356.0 | - | - | 356.0 |
| Marine & Suez Canal ^c | 397.0 | 70.2 | - | 467.2 |
| Civil Aviation | 40.6 | 52.2 | - | 92.8 |
| Sub-Total | <u>1498.2</u> | <u>122.4</u> | - | <u>1620.6</u> |
| <u>Petroleum:</u> | | | | |
| Research & Production | 191.2 ^b | 61.8 | - | 253.0 |
| Refining and Manufacture | 202.5 ^b | 86.8 | - | 289.3 |
| Transport and Distribution | 182.3 ^b | 36.5 | - | 218.8 |
| Sub-Total | <u>576.0^b</u> | <u>185.1</u> | - | <u>661.1</u> |
| <u>Electricity:</u> | 864.5 | 10.2 | - | 874.7 |
| TOTAL | 4259.9 | 651.8 | 124.0 | 5035.7 |

^aIncludes LE 60 million earmarked for foreign investment with public sector companies.

^bIncludes all long-term projects considered for 1981/82.

^cSuez Canal is an independent authority for the ministry.

stations, minor bridges, and internal roads. The minor connections and hook-ups to existing lines are nearly always done by the utility agencies which, without exception, are government owned. This force account work is done at the expense of the individual owner once the necessary permits/licenses have been obtained and the fees for the services paid. There is considerable potential for delays beyond the control of the owner. The cement plant south of Suez, for example, encountered serious delays due to the Egyptian authorities' failure to deliver water, electrical power, and railroad lines (79). Although a major portion of the necessary construction may be carried out by the contractor on the job, the final connection must generally be done by the government agency itself.

3.2.4.2 Government

The government is directly responsible for: (a) the planning, financing, and execution of roads and other civil works; and (b) the general operation of these facilities in their provision of services to the general public. Project planning in the areas of transportation, communication, irrigation, and electricity and other utilities is a complex process involving formal as well as informal channels of communication among several levels of government.

Project conceptualization begins at the local, or governorate level; at the central level, specific ministries (Irrigation, Electricity, and Transportation) as well as various planning authorities (the Transportation Planning Authority, General Organization for Sanitary Disposal, and General Authority for Drinking Water) also contribute to the process, particularly in view of the

understaffing/underbudgeting of the local authorities. Other agencies also enter the picture, especially for funding approval, including the Ministry of Planning which controls capital expenditure appropriations, the Ministry of Finance for operating and wage/salary funds, and the Cabinet and People's Assembly for final adjustments on the yearly budget.

Lack of coordination means that projects are generally considered singly rather than as part of a particular sectoral strategy or integrated development plan, regulating planning to a question of project timing. Other considerations, such as availability of loans and political significance may favor the implementation of one proposed project over better planned ones such as the water and sewage projects in Cairo and Alexandria. Weaknesses in the planning process often result in frequent and extensive revisions in the course of project implementation (18).

The activities of local agencies charged with running these facilities depend on the collection and allocation of public funds by the national government, specifically the Ministries of Planning and Finance. Three budgets comprise the national annual budget, the operating, wage and salary, and capital expenditure budgets; and once funds are allocated to one of these three, they are rarely transferred in the course of the fiscal year. In the case of the utilities sector, for example, the Five-Year Plan (6-Vol.V) blames "total disregard for these utilities, failure to maintain them carefully and to raise their effectiveness and the shortage of investments apportioned for them for several years" for their poor performance and

operational problems. As is true in other developing countries, the Egyptian government has tended to give priority to new facilities over maintaining and upgrading existing ones when confronted with a limitation of resources. The new Five-Year Plan indicates possible changes in attitude with its emphasis on raising the capacity of existing projects to the same level as investment in new ones.

3.3 THE PROFESSIONAL SECTOR

In Egypt, every facility over LE 5,000 in value requires the signature of an architect, engineer, or consultant on the plans in order to obtain a permit or license (and hence materials), as well as professional supervision during construction. At current prices, LE 5,000 represent the value of one flat, which means that professional involvement is necessary in nearly all construction in Egypt. Most professionals are private individuals, although the public sector does employ many architects and engineers as well.

3.3.1 Registration and Number of Professionals

The Egyptian Syndicate of Engineers maintains a registry of engineers and architects; to register, an individual must be a member of a Syndicate and hold a university degree in architecture or engineering. Most eligible professionals in fact register upon graduation regardless of their future career. As of July, 1978, only a total of 204 consultants were registered in areas related to construction; nearly half were civil engineers (Reference 80).

In 1978, a new graduate in the private sector in Egypt typically earned LE 150 per month plus transportation and a mid-day meal. This figure would rise to LE 180 to 220 after two years, and

after eight to LE 250 to 300. Public sector earnings were lower, beginning at LE 75 to 120, and the government paid the lowest salaries of all, LE 50 to 75. However, overtime pay, site incentives, free transportation, and other fringe benefits, the most significant of which is a guaranteed position, attract professionals to the public and government sectors. Higher paying jobs abroad were nonetheless luring professionals away from Egypt at rates of 15 to 20 percent in 1977. Engineers, teachers, doctors, and other professionals in limited supply were required to work for the government and public sectors for six years in order to restrict their exodus.

3.3.1.1 Private Sector Professionals

The professional sector serving the construction industry in Egypt is largely private and composed of professors, ex-ministers, and others who are trained as architects and engineers and organized as sole proprietorships and partnerships for the purpose of providing consultant services on a part-time basis. Government and public sector employees are prohibited from participating in such jobs, although this is rarely enforced. A typical, reasonably large architectural office may consist of twenty part-time professionals working on design, and another thirty staff members supervising construction, of which perhaps a few are full-time. In a firm whose work is divided equally between housing and other buildings, there may be seven or eight architects employed for each engineer.

In the past, this system of small-scale professionals consulting in their afternoon hours satisfied construction's needs. In the last ten years, however, full-time,

private design firms have begun to develop. Engineering Consultants Group (ECG), established in 1969, was the first such organization, followed by Misr Consultant Engineers (Misr CE) and Sabour in 1975, and Arab Consultants in 1976. These four firms are the only sizeable, full-time private consulting operations in Egypt. Their development has been constrained by variability in the volume of work, sizeable capital requirements, and costliness and shortage of office facilities, and the future of this type of firm depends on a strong construction market.

These larger operations with full-time staffs perform a more diversified range of services for different types of construction than their smaller counterparts. Both Misr CE and ECG have 200 employees, of which 40 to 50 percent are engineers and other professionals and the remaining 50 or 60 percent draftsmen, surveyors, and technical personnel. Each provides the full spectrum of services from feasibility studies through supervision of construction and even construction management, for all types of facilities from infrastructure and civil works construction through residential building.

Misr CE, for example, in its first three years of operation has participated in or prepared: (a) the master plan for sewage in Helwan -- a joint venture with four German companies; (b) the design for the infrastructure (i.e., water, sewage, electricity, communications, and roads) for 10th of Ramadan -- Arab Contractors is undertaking the construction; (c) a traffic study in Cairo of eleven overpasses (flyovers), many of which are under construction; (d) a feasibility study of land reclamation for Pepsi Cola and Arab Contractors; (e) the main bridge in Port Said; (f) an office building

for ICON, to be shared by Misr CE; (g) the Hope and Faith Hospital in Nasr City for the war injured, and (8) a 600 megawatt power plant with Bechtel Corporation for the Ministry of Electricity (proposed). In industrial construction, the supplier of plant equipment normally joins a local professional in providing consulting services.

International contracts, in which local firms enter into a joint venture with or subcontract to a multinational, are reasonably common. Local firms may also become approved consultants for various international agencies by filing an application relating past experiences and references from clients. ECG performs such a consulting role for the IBRD, WHO, and UNDP. Some of these firms practice other services such as ECG's Middle East Advisory Service and computer business, a Swiss subsidiary owned by ECG operating in Egypt under Law 43.

3.3.1.2 Public Sector Professionals

The public sector's role in the professional sector of construction in Egypt is indeed limited. The Arab Bureau of Design (ABD) and the Development and Popular Housing Company are the only two public design firms. As its name suggests, the second firm works largely in the area of housing and is really more of a developer, sometimes even subcontracting the design, though it does in these cases supervise the construction. It has recently become involved in land development as well. ABD, on the other hand, began as a design office in the Ministry of Housing which also supervised government buildings including hospitals, administration facilities, universities, and housing. Until early 1978, it worked mainly under direct order from the

Ministry, but now competes with other design firms for work. Ten percent of its work is for the private sector. ABD also has engaged in work abroad, including universities in Iraq and Saudi Arabia, and may undertake some new work in Africa. Its domestic construction volume in recent years is estimated to be worth LE 10 million. With a staff of 450 full-time employees, of which 40 percent are technical and 60 are administrative (including financial and legal personnel), it offers design, supervision of construction, and feasibility study services, among others.

3.3.1.3 Foreign Professionals

Foreign consultants have been involved primarily in large-scale, sophisticated, public and government projects like industrial plants and civil works. With the enactment of the Open-Door Policy and Law 43, and the growth of the private sector, however, their activities might be expected to shift to ones typically initiated by the private sector, such as major hotels and industrial facilities.

Beginning in 1974, the MOHR established a prequalification procedure for foreign consultants and contractors working on government projects. For a particular project, five or fewer consultants, are selected from those responding, on the basis of their personnel and past experience, and invited to submit a technical and financial offer. The best bid is negotiated. Egyptian ministries hire foreign consultants for a wide range of services, including general planning and development assistance, feasibility and master plan studies in civil engineering, new town planning, design, and implementation, and industrial studies and construction. These consultants come from a wide

range of countries like Germany, U.K., U.S., Greece, Yugoslavia, Iran, Brazil, and India.

A multinational working in Egypt must have as a representative a local partner who may also enter into a joint venture with or subcontract to the foreign firm. It is estimated that thirty firms in Egypt may be engaged with multinational consultants, generally in rather specialized areas like legal advice and design. The local firm might be retained on a commission basis by the multinational to advise it of opportunities for work, to assist it in responding to potential projects, and to provide on-the-job support in the form of local personnel, subcontractors, and consultants. A breakdown of foreign consulting firms operating in Egypt by size, and new capital composition is shown in Table 3.4.

Joint ventures are not mandatory, however, for foreign consultants to operate in Egypt. Only firms operating under Law 43 are required have at least 49 percent Egyptian participation. Many foreign consultants are working in Egypt on a temporary, project-by-project basis. This is especially prevalent with U.S. firms. While GAFI information listed only 7 consulting joint ventures with U.S. firms, the Engineering News Record list of top 500 U.S. A/E firms included 56 firms performing work in Egypt in 1981 (15). These included some of the largest firms in the U.S.: seven of the top 10 firms had operations in Egypt. Also, of the 50 firms leading the construction management market 18 had operations in Egypt.

The reason that so many foreign firms are not forming joint ventures may be due to the required 49 percent minimum

Table 3.4

Distribution of Technical Consulting Projects
Approved by The Investment Authority and Producing in Egypt
As Of 31/12/81

Source: Reference (3)

| Participants Nationality | # Projects | Capital |
|---------------------------------------------------|------------|---------|
| All Non Arab | | 2,498 |
| American | 6 | 576 |
| British | 2 | 137 |
| German | 1 | 100 |
| Italian | 1 | 25 |
| Swiss | 2 | 632 |
| All Non-Egyptian Arab | | |
| Kuwait | 1 | 207 |
| | 1 | 70 |
| All Egyptian | 16 | 4,682 |
| Egyptians alone | 2 | 1,050 |
| All Projects | 17 | 7,385 |
| Size of Projects by Paid-in Capital in LE 1000 | | |
| 1,000 + | 3 | 4,654 |
| 500-999 | 1 | 700 |
| 200-499 | 4 | 1,150 |
| 100-199 | 5 | 615 |
| 50-99 | 4 | 266 |

Egyptian participation, or may just be due to the fact that Law 43 does not offer special incentives to consulting firms. The tax exemption provided by law for consulting firms also applies to reconstruction and new community projects. Furthermore, tax exemptions do not really affect American firms since they are taxed by the U.S. government on their global income, including in many cases their Egyptian tax free income. Finally, the Egyptian tax department provides new and temporary consulting offices a tax exemption for three years, regardless of nationality or type of organization (79).

3.3.1.4 Other Professionals in Construction

Some clients and contractors have in-house design capabilities. GABHC in its role as developer, for example, performs full professional services, which it claims keeps its design and supervision costs to a minimum of 1.5 to 2 percent each. Similarly, Nasr City Company recently expanded its operations to include the design and supervision of construction for some of its more traditional projects, amounting to 700 to 1000 units per year. Other industrial developers, like ICON, tend to rely more on their foreign partners and local consultants for professional capabilities, although ICON has a technical staff to assist in equipment selection. Finally, many of the ministries have large technical staffs and employ numerous engineers, although they do little in-house design, and what is done is strictly for government construction, in mainly irrigation and drainage, transportation, communication, and electricity.

Larger public contractors like Arab Contractors and Misr Concrete, and even large private ones, like Dorra Co., have design

departments. These, however, generally only check, detail, and possibly modify plans and specifications; their main responsibility is to oversee on-site construction. Misr Concrete's only design-construct contracts are for cement plants. Other smaller public and private contracts may not even have a design office, but rather hire outside consultants as needed for project execution. Contractors still employ a large number of professionals, however; Arab Contractors, for example, employs 1700 engineers and architects and a similar number of supervisors (not including labor supervisors) out of its permanent staff of 28,000.

3.3.2 The Professional Sector's Operations

3.3.2.1 Contracts

Professional contracts, public and private, are generally negotiated. News of small contracts are often spread by word-of-mouth, while larger ones are generally formally advertised, even internationally if appropriate. In these cases, selection is based on competitive price and merit criteria.

Public clients and the government frequently have in-house teams of project managers, and rely upon the professional consultant only for technical supervision. The consultant may provide the full spectrum of services as an owner's agent, but may not accept contracting work. Only a contractor can accept a design-construct contract; he may then either do the design in-house, or subcontract it.

The professional duties, according to the code of practice of the Syndicate of Engineers (13), are primarily to prepare the necessary drawings and documents for the execution of the project.

They are also responsible for designating the type of foundation of the structure; drafting its technical specifications, bill of quantities, and all associated documents; assisting in the review of the bids for construction of the projects; and selecting the type and specifications of materials to be employed. The primary professional, such as the architect in non-industrial buildings, selects the various specialists who will assist him in the preparation of the project, subject to the approval of the owner. According to the law, the professional is responsible for the safety of all designs he prepares. He is expected to periodically inspect the work to ensure its adherence to specifications. All drawings and documents prepared by the professional are considered his property and are guarded against further use without his consent.

The consultant is compensated either in a lump sum or, more commonly, as a percentage of the value of all work executed. Other, less often used forms of payment include a percentage of the construction cost with a ceiling, man-month rate basis (wage plus overhead), and expenses plus fee. These are gaining more acceptance with foreign firms and on large projects. Foreign fees average from 4 to 6 percent of construction cost and supervision from 2 to 4 percent. These rates tend to be slightly lower for public clients and the government, and vary from a high of 12 percent to a low of 1 percent, depending upon the particular client, type of construction, volume of work, timing, and difficulty of the particular project. ABD, for example, might receive 3 to 4 percent for a new design for an administrative building and 1.5 to 1 for a modification of a previous

design. These rates, cited in the course of discussions with participants, are somewhat lower than officially stated by the Egyptian Syndicate of Engineers. The Syndicate has devised a basic fee structure for various classes of professionals and types of work. Each branch of the Syndicate details its own fee structure for specific duties and responsibilities. The government may be up to a couple of months behind in its payments to professionals, more often for supervision than for design. This problem is apparently limited to the public sector, since the government generally cannot sign a contract with the private sector until the budget for the work is available.

3.3.2.2 Costs of Business

Letters of guarantee or performance guarantees issued by a bank are often required by the client. To furnish these guarantees public sector banks in turn require the consultant be able to back them for their full amount unless he has some fixed assets or is very well established. Foreign banks request only 10 to 20 percent, and some new Egyptian banks are also more flexible, thereby helping to alleviate this difficulty.

Professional liability insurance is not generally available in Egypt, although it may be required by clients abroad. Moreover, under civil law, the engineer, along with the contractor, is criminally and monetarily liable for building collapse for up to ten years after construction. The owner of any structure over LE 10,000 in value is now required by law now to purchase liability insurance to protect himself and third parties during construction and for at least ten years thereafter.

Fiscal stamps must be placed on all drawings by the architect or engineer. Purchased from the Syndicate of Engineers, their cost varies with the value of construction, number of drawings, and so forth, averaging about LE 5 per LE 1000 of construction. Fees collected go to the pension fund and other services of the Syndicate.

3.3.2.3 Taxation of Professionals

Professionals are taxed on a separate basis, unless they are incorporated, in which case they are subject to commercial rates and laws, like contractors. Income earned abroad is taxed only if the firm operates out of an office in Egypt. One consultant interviewed observed that taxation is only a problem for those who fail to keep records and must therefore pay an estimated tax set by the Tax Office (75); the taxation of professions in Egypt is further detailed in Chapter V.

3.4 CONTRACTORS SECTOR

The contractor assumes the main responsibility for the execution phase of the construction process. The sector is composed of the contractors in charge of the assembly of the constructed facility, and the suppliers of building materials and equipment. We shall now investigate the characteristics and operations of these actors in Egypt, beginning with the suppliers.

3.4.1 Suppliers of Building Materials and Equipment

The supplier is responsible for the provision of building materials and equipment needed for project execution. These suppliers often are not the manufacturers or wholesalers and serve as local distributors. They also may provide the other participants with useful

technical and commercial information and serve as a potential source of working capital for the contractor or subcontractor by extending short-term credit on purchases. The supplier is often blamed, even in industrialized countries, for obstructing the introduction of technological innovations by failing to adjust his stocks as readily as he might.

In Egypt, there are two types of suppliers: (a) those who deal in locally produced material and/or equipment (local suppliers), and (b) those who deal in imported items (import/export companies). The import/export field was re-opened to the private sector only in 1975, and has been growing ever since.

3.4.1.1 Local Suppliers

To be registered as a supplier requires proof of the existence of a store or office. As of May 1977, official registration figures showed nearly 26,000 local suppliers and producers of building materials, over 1,200 local suppliers of equipment and machinery, over 12,000 companies in the import/export and commercial representation business, and nearly 3,700 in commercial representation alone (Reference 79). Only the first of these figures pertains solely to construction; the others represent much broader classifications of suppliers and traders.

Suppliers of local materials and equipment tend to be small, highly specialized, private firms. Many of the manufacturers, on the other hand, are large, public companies, a few of which handle their own distribution. Most local suppliers specialize in building materials. Only a few concentrate on equipment and tools. They are

mainly distributors for larger import/export firms. In a few cases, they sell locally produced equipment and tools. Local suppliers in urban areas tend to specialize in one or more related products and are generally organized as proprietorships or partnerships. Specialty contractors occasionally manufacture their own materials. Volcan Co., for example, which produces and installs cement tiles, sells 40 percent of those tiles on a retail basis. In rural and small urban settlements, local suppliers deal in a broader range of items. This picture has begun to change somewhat with the recent introduction of larger, stock-issuing, general supplier import companies like ICON and INCOMAS discussed below.

Public sector involvement in local supply for construction began when the government, in the interest of controlling construction costs, regulated the production, trade, price, and distribution of the major building materials, including cement, steel, wood, and glass. Long before the nationalization of the cement industry, the four cement producers had jointly formed the Egyptian Cement Office as a sales office. All public sector materials producers and centralized sales offices are now under the aegis of the MOH. In recent years, to supplement local supplies, certain materials have been imported.

Cement is distributed directly to the client on site according to quantities specified in the building permit, while reinforcing bars and steel are delivered first to district offices. Other regulated materials are distributed to district offices on the basis of quotas set by the government according to the yearly plan for

the governorate. This allocation system tends to give some priority to government and public sector clients and public contractors, and has spawned an extensive black market in these materials. Certain clients, like those building luxury housing, cannot even obtain regulated materials officially; rather, they must import or buy these goods on the black market. Public sector producers of other materials, such as sand-lime bricks, and equipment, mainly tractors and transport equipment subject to government-set prices, often handle their own distribution as well.

To boost sales, private local suppliers develop and maintain contacts with contractors, consultants, and clients. These suppliers tend to pair off with private contractors, while public suppliers cultivate contacts with government/public contractors. Materials and equipment for the government/public sector and even large private sector projects, however, are supplied through open or limited tenders.

Public and government contracts routinely require guaranteed deposits on the part of the supplier (1-2 percent as a bid deposit, raised to 5-10 percent upon award), and suppliers are paid in cash or by letter of credit. Dealings within the private sector are often much more informal, as evidenced by the frequent lack of recourse to banks. Even small private suppliers extend credit to their regular customers. In contrast, not only do public suppliers never extend credit but more often they require payment in advance of delivery from private and public customers. This might be attributed to shortages in working capital, their monopolistic situation in the market, or excess

demand. Uncertainties in production, distribution, and demand make maintaining and planning reasonable inventories a problem for the local supplier in Egypt. This leads to hoarding in times of surplus and the use of precious working capital.

3.4.1.2 Import/Export Companies

Like most developing countries, Egypt is attempting to reduce its reliance on imported building materials and equipment. In the past two decades, it established national production facilities for many building materials. However, the rapid growth in demand for construction outstripped resource supply, and certain basic inputs, like wood and equipment, continued to be imported. When it became clear that import substitution alone was insufficient, the government moved to attract foreign investment and liberalize its import/export policies. Private sector firms were allowed to participate in the field, and foreign exchange regulations were eased somewhat. These changes have increased the importance of the import/export supplier in the construction process.

Before 1975, import/export activities in Egypt were monopolized by a handful of large, public sector companies. With the liberalization of the import/export market, the government protected Egyptian businesses by requiring all foreign firms conducting commercial operations in Egypt to be registered with the government and represented by only one Egyptian firm. (There is still some discussion over whether this representation should be country-wide or governorate-specific.) As of May 1978, 202 Egyptian firms were officially registered as representatives of 337 foreign suppliers of building materials and

construction equipment in Egypt. The geographic distribution of these suppliers (most are from Western Europe) and the range of items they supply to Egypt is indicated in Table 3.5. Private and public firms with over 50 percent of their capital owned by Egyptians can act as commercial agents.

The new private sector firms in the import/export field tend to be small, but still able to handle a broad range of products. They range from proprietorships whose turnover is only a few thousand Egyptian pounds per year to partnerships and incorporated businesses with turnovers of millions of pounds. A growing part of this sector is the rather large, diversified firm and local supplier-import/export company serving the construction industry. International Commerce and Services (INCOMAS), formed as a partnership as an offshoot of Dorra Co., had sales totalling LE 2 million in 1976, LE 4 million in 1977, and an expected LE 6 million in 1978. It deals in both materials and equipment for construction as well as Goodyear tires, and has a center for the maintenance and repair of equipment. It also has an interest in developing a branch for leasing equipment. INCOMAS provides some financing for its customers.

Another new firm, Industrial Engineering Company for Construction and Development (ICON), founded by 85 persons from Arab Contractors, and supported by 6,200 employees of Arab Contractors as stockholders, is both a supplier of imported materials, equipment and associated services and a developer of industrial facilities to produce materials and equipment for construction which ICON will also distribute. Joint venture projects will in the future target investment

TABLE 3.5

Foreign Suppliers of Building Materials and Construction Equipment
in Egypt, Registered as of May 1978

Source: Reference (57)

| Category of Supplier | Origin of Supplier ^a | | | | Developing Countries |
|--------------------------------------------|---------------------------------|----------------|---------------|-------|----------------------|
| | Eastern Europe | Western Europe | U.S. & Canada | Japan | |
| Equipment Suppliers: ^b | | | | | |
| Transport | 4 | 22 | 15 | 4 | India |
| Earthmoving | - | 5 | 1 | 1 | - |
| Building | - | 42 | 2 | 1 | - |
| Civil Engineering | - | 9 | 4 | 1 | - |
| General | - | 7 | 4 | 1 | - |
| Pumps | 1 | 25 | 7 | - | India |
| Tools and Small Equipment | - | 28 | 2 | 2 | - |
| Spare Parts | 3 | 20 | 7 | 3 | India and Australia |
| Building Materials Suppliers: ^c | | | | | |
| Wood | 7 | 28 | 1 | - | India and Taiwan |
| Cement | - | 9 | - | 1 | - |
| Steel | - | 4 | 1 | - | - |
| Secondary Building Materials | - | 24 | 1 | - | Cyprus and Turkey |
| Mechanical and Electrical | - | 7 | - | - | - |
| Building Components and Fixtures | 1 | 23 | 2 | 1 | - |
| General Building Materials | - | 8 | 3 | - | - |

Note: These figures may not be complete; this is only intended to serve as an indication of the geographic distribution of foreign suppliers and range of goods supplied.

^aOrigin of Suppliers: Eastern Europe includes Yugoslavia, Hungary, Czechoslovakia, Romania; Western Europe includes England, France, West Germany, Finland, Austria, Sweden, Greece, Italy, Holland, Denmark, Belgium, Spain.

^bEquipment Suppliers: Transport includes all cars, trucks, trailers; Earthmoving includes all bulldozers, scrapers, loaders; Building includes all concrete-making equipment, cranes, hoists, framework and scaffolding, foundation equipment; Civil Engineering includes all road building equipment, crushers, dredgers; General includes all equipment used in construction without particular specialization; Pumps includes all water pumps (no distinction between temporary and permanent ones); Small Equipment and Tools includes all compressors and tools for reinforcing steel, plastering, painting, as well as small hand tools.

^cBuilding Materials Suppliers: Secondary Building Materials includes all finishing materials like paints, wall paper, tiles, carpets; Building Components and Fixtures include doors, windows, knobs, sanitary fixtures, electric appliances; General Building Materials include all building materials in general.

to aluminum profile sections and pipes, metal shuttering and scaffolding, wood and aluminum doors/windows/frames, and a construction development company using slip-form and lift-slab construction techniques.

ICON represents a wide range of international manufacturers of construction equipment and materials and electrical equipment including Coles Cranes Ltd., Euclid Europe S.A., John Deer, Acrow Ltd., Reynolds International Inc., and General Electric. Its commercial sales have grown quickly from LE 1.2 million in 1976, to LE 9.5 million in 1977, to a projected LE 15 million in 1978. ICON was also investigating the possibility of financing customer purchases and a joint venture with a U.K. firm for leasing equipment.

Such activities demonstrate the potential role these firms might play in technology transfer and adaptation, influencing the availability of new materials, equipment, spare parts, and maintenance facilities as well as introducing new approaches like equipment rental, supplier's credit, and second-hand markets.

3.4.1.3 Operation of Suppliers

When dealing with public and clients, private import/export firms, like local suppliers, must submit letters of guarantee of 5 to 10 percent. It is not clear whether the public import/export suppliers are exempt from this as are public contractors. Upon ordering merchandise, a letter of credit is generally required from the customer, and in cases of special orders, perhaps a 10 to 25 percent advance payment. Orders are still generally paid in full upon delivery. The availability of foreign exchange does not seem to be too serious a

constraint for private customers and large import/export firms. The supplier will often assist in exchanging local currency through foreign partners, the parallel market, or even the black market.

Commissions are the primary source of income for suppliers. Most government, public sector, and large scale private sector needs for materials and equipment are advertised in open tenders. Given up to a month to respond, the import/export company must assess international and local market conditions, adjust his commission accordingly, and place a bid, which incorporates the specifications of the merchandise being offered (generally including a spare parts package), its price, and the delivery time (2-3 months for equipment). The successful bidder usually receives a commission from both the Egyptian client and the foreign supplier, the latter generally in hard currency. Commissions on equipment, purchased at a pre-determined price with a fixed-term guarantee (including labor servicing) might be 8 to 15 percent; one materials supplier cited 5 percent as a more common commission. Profits, however, are reported to be far below this -- 2 to 5 percent on materials and 2 to 3 percent on equipment. Law 119 of 1978 was enacted to control import/export firms' profit margins, but seems somewhat unnecessary in view of the current competition.

All suppliers, local and import/export firms, private and public, are taxed under the commercial and industrial tax at a rate of 33 percent of net profits. Small private firms, however, sometimes have difficulty in validating their books with the tax office which makes them susceptible to an arbitrary determination of their profits. The Cairo Tax Office for Construction cites rates of 10 to 25

percent of turnover as taxable income for various building material suppliers and producers in this situation. This rather high rate, coupled with the graduated income tax, may tend to discourage small suppliers, especially those organized as proprietorships and partnerships, and encourages tax evasion.

3.4.2 Contractors in Egypt

The contractor sector of the construction industry in Egypt is made up of a substantial number of small private contractors and a limited number of large, public contractors. The nationalization and aggregation of firms in the sixties reflected a government desire for local contractors to assume most local work. With the public sector essentially having accomplished this goal, attention is now increasingly being directed towards developing the private sector and encouraging joint ventures with foreign firms.

3.4.2.1 Public Sector Contractors

There are 54 public sector companies now operating in Egypt whose construction output in 1979 approached a value of LE 835 million. Twenty-nine of these companies which operate under the aegis of the Ministry of Housing were responsible for 75 percent of that output. Individual company statistics for 1977 to 1979 (Table 3.6) show the size of these companies' combined domestic and foreign construction operations to vary from LE 1.4 million to over LE 245 million; most range from LE 8 to 50 million. The three largest account for over half the total volume; the largest (Arab Contractors) alone produces a little over a third.

TABLE 3.6

Volume of Work Executed by 29 Companies
Under the Ministry of Housing

Source: Reference (22)

(Values in LE Million)

| | 1977 | | | 1978 | | | 1979 |
|----------------------------------------------|--------------|--------------|--------------|--------------|--------------|-------------|-------|
| | Total | Domestic | Foreign | Total | Domestic | Foreign | Total |
| 1. Arab Contractors | 166.3 | 154 | 13.3 | 237 | 217 | 21 | 245 |
| 2. Misr Concrete | 68.4 | 27 | 41.3 | 63 | 29 | 34 | 73.3 |
| 3. El Nasr General Contracting | 45.5 | 36.5 | 9.0 | 62 | 80 | 12 | 50.2 |
| 4. Egyptian Contractors | 27.2 | 19.5 | 7.7 | 32 | 25 | 7 | 32.0 |
| 5. Gomhariah General Contractors | 13.3 | 13.3 | 0 | 19 | 19 | 0 | 20.0 |
| 6. Cairo General Contracting | 21.8 | 15.8 | 6.0 | 18 | 18* | 0 | 25.0 |
| 7. Arabian Contracting | 13.0 | 12.8 | 1.2 | 18 | 18* | 0 | 24.0 |
| 8. Egyptian Contracting Co. Ltd. | 20.8 | 14.7 | 6.1 | 17 | 17* | 0 | 18.5 |
| 9. Atlas Gen. Contracting | 19.6 | 15.6 | 4.0 | 16 | 16 | 0 | 13.5 |
| 10. Nile Gen. Co. for Reinforced Concrete | 14.6 | 10.2 | 4.4 | 15 | 15* | 0 | N.A. |
| 11. El Nasr for Building & Construction | 12.7 | 12.7 | 0 | 15 | 15* | 0 | 20.9 |
| 12. The General Co. for Construction | 12.1 | 8.2 | 3.8 | 12 | 12* | 0 | N.A. |
| 13. Engineering & Industrial Projects | 9.6 | 9.6 | 0 | 11 | 11* | 0 | 14.0 |
| 14. Nile General for Contracting | 7.6 | 7.6 | 0 | 9.4 | 9.4* | 0 | 10.2 |
| 15. El Nasr for Civil Works | 6.1 | 6.1 | 0 | 9.2 | 9.2* | 0 | 17.3 |
| 16. Mahmoudiali for Contracting | 7.0 | 7.0 | 0 | 8.7 | 8.7* | 0 | N.A. |
| 17. Nile General for Bridges | 7.3 | 7.3 | 0 | 7.6 | 7.6* | 0 | 10.9 |
| 18. Giza General for Contracting | 9.8 | 5.4 | 4.4 | 7.5 | 7.5* | 0 | 10.0 |
| 19. Delta General for Contracting | 5.2 | 5.2 | 0 | 7.0 | 7.0* | 0 | N.A. |
| 20. Arab Co. For Foundations | 6.0 | 6.0 | 0 | 6.7 | 6.7* | 0 | 5.8 |
| 21. El Said General for Contracting | 5.6 | 5.6 | 0 | 6.5 | 6.5* | 0 | 8.6 |
| 22. New Valley for Contracting | 3.9 | 3.9 | 0 | 5.0 | 5.0* | 0 | 5.8 |
| 23. Red Sea General for Contracting | 3.5 | 3.5 | 0 | 4.3 | 4.3* | 0 | 4.3 |
| 24. Canal General for Contracting | 3.0 | 2.9 | 0.1 | 4.2 | 4.3 | 0 | N.A. |
| 25. General Contracting for Sanitary Work | 3.0 | 3.0 | 0 | 3.5 | 3.5 | 0 | 1.5 |
| 26. Alexandria General For Contracting | 3.2 | 3.2 | 0 | 3.4 | 3.4 | 0 | 4.5 |
| 27. Egyptian General for Building | 3.2 | 3.2 | 0 | 2.8 | 2.8* | 0 | N.A. |
| 28. Nasr Installation of Utilities | 3.1 | 3.1 | 0 | 2.3 | 2.3* | 0 | N.A. |
| 29. General for Foundation Contracting | 0.7 | 0.7 | 0 | 1.2 | 1.2* | 0 | 1.4 |
| TOTAL | 522.8 | 421.5 | 101.3 | 624.0 | 550.0 | 74.0 | |

N.A. = not available

* = assumed by reference (22).

Since the nationalization of the construction industry in 1961, public sector contracting companies are now largely fully owned by the government (with the exception of a few in which the public still holds some capital shares), and operate under the law much like regular stock-issuing companies. Public sector contractors divide their work between the government and public client. A large share of the public sector's effort is devoted to roads, other civil work construction and industrial building. In part this reflects the scale of the projects involved. The public sector is responsible for larger scale projects which are beyond the scope of most private contractors. These, in turn, subcontract for portions of these projects.

The work undertaken by various firms is broadly specified and essentially corresponds to the type of work undertaken by the controlling Ministry. The 29 companies under the Ministry of Housing, however, perform a wide spectrum of building and civil works operations (Table 3.7). While the largest firms routinely carry out all types of work, the rest tend to specialize in either general building or non-building construction. Although the table does not break down the output of all 29 firms, it can be assumed that more small firms specialize in general building than in non-building.

3.4.2.2 Private Sector Contractors

Official figures show about 12,000 to 15,000 general and specialty private contractors and an additional 6,700 private labor contractors to have been registered at the end of 1977 (Table 3.8). These figures, however, are not entirely reliable. First, some of these firms were divided into several units to get more work

TABLE 3.7

Types of Work Undertaken by Some of the 29 Companies
Under the Ministry of Housing in 1979
According to the Survey Conducted By The World Bank Construction Study Team

Source: Reference (22) Appendix A5

| Type of Construction | Firm Numbers Correspond to Table 3.8 | | | | | | | | | | | | | | | | | | | |
|--------------------------|--------------------------------------|------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| | (1) | (2) | (3) | (4) | (6) | (7) | (11) | (5) | (8) | (15) | (13) | (9) | (17) | (14) | (18) | (21) | (22) | (20) | (26) | (23) |
| Residential ¹ | 33.1 | 2.0 | 4.1 | 4.8 | 2.0 | 5.7 | 1.4 | 9.2 | 0.7 | 4.1 | 0.7 | 4.7 | 0.9 | 3.4 | 4.0 | 2.2 | 2.6 | - | 1.8 | 1.9 |
| Industrial | 68.1 | 64.0 | 7.6 | 3.2 | 7.5 | - | 6.2 | 0.5 | 7.6 | 0.4 | 0.7 | 2.7 | 0.9 | 1.5 | 1.5 | 1.7 | 0.9 | - | 1.4 | 0.6 |
| Other Buildings | 55.6 | 1.3 | 20.9 | 9.8 | 8.0 | 17.7 | 9.2 | 9.9 | - | 1.1 | - | 4.7 | 2.6 | 2.5 | 3.8 | 3.5 | 2.4 | - | 1.4 | 1.8 |
| Roads | 16.0 | 2.0 | 14.1 | - | - | - | - | - | - | - | - | 0.7 | 0.5 | - | 0.2 | - | - | - | - | - |
| Other Construction | 71.9 | 3.9 | 3.6 | 14.4 | 7.5 | 0.3 | 4.2 | - | 10.2 | 11.3 | 12.6 | 0.7 | 7.7 | 3.1 | 0.6 | 1.3 | - | 5.8 | - | - |
| 1979 output | 245 | 73.3 | 50.2 | 32.0 | 25.0 | 24.0 | 20.9 | 20 | 18.5 | 17.3 | 14.0 | 13.5 | 10.9 | 10.2 | 10.0 | 8.6 | 5.8 | 5.8 | 4.5 | 4.3 |

*types include

(1) Residential buildings

(2) Industrial plants

(3) Other buildings include: office and administrative, commercial and storage, hospitals and welfare, educational, hotels, maintenance, and other buildings.

(4) Roads construction

(5) Other construction include: power plants, bridges, airports, marine, dams and locks, irrigation and drainage, canals, land reclamation, water supply and sewage, mechanical and elec. installation, site fabrication, foundations, other non-building.

TABLE 3.8

Number of Contractors in Egypt According to Various Registration Offices

| Year | Private Contractors Registered with the Office of Private Sector Contractors, (MOH) | | | | | Contractors Holding a Commercial ^a Registry Number | | | | Contractors Paying Taxes ^b in the Cairo Tax Office for Construction | | |
|------|-------------------------------------------------------------------------------------|-----------|----------|-------|-------|---------------------------------------------------------------|----------|--------------------|-------|--------------------------------------------------------------------------------|-------|-------|
| | General | Specialty | Subtotal | Labor | Total | General | Building | Building & General | Total | General & Partial Building | Civil | Total |
| 1966 | 3384 | 2831 | 6715 | 2996 | 9711 | | | | | | | |
| 1971 | 6013 | 4226 | 10239 | 4621 | 14860 | | | | | | | |
| 1972 | 6449 | 4427 | 10876 | 4951 | 15827 | | | | | | | |
| 1973 | 6913 | 4630 | 11543 | 5216 | 16759 | | | | | 3951 | 109 | 4060 |
| 1974 | 7470 | 4900 | 12370 | 5566 | 17936 | | | | | 4344 | 118 | 4462 |
| 1975 | 8070 | 5130 | 13200 | 5866 | 19066 | 6529 | 834 | 2068 | 9431 | 4753 | 126 | 4879 |
| 1976 | 8708 | 5352 | 14060 | 6148 | 20208 | 7102 | 2327 | 2327 | 10693 | 5103 | 140 | 5243 |
| 1977 | 9381 | 5566 | 14974 | 6715 | 21662 | 7445 | 1457 | 2411 | 11313 | 5417 | 152 | 5569 |
| 1978 | 10035 (August) | 5843 | 15878 | 6863 | 22741 | (June) | | | | | | |

Note: The fact that the number of contractors registered in the Commercial Registry is less than that with the Office of Private Sector Contractors is somewhat surprising in that a first requirement is a Commercial Registry number; also only contractors who want to work on public and government contracts register with the Office, although all are supposed to have a registry number. The CPMAS contractor studies (7,8) in the early seventies show about a third of the private contractors to be in Cairo which places the Tax Office figures on number of contractors in Egypt somewhere between those of the other two sources.

^aCategories 1720, 1718, and 1722, respectively.

^bCategories 410 and 420, respectively.

Source: Offices indicated in table.

during the years when the turnover of individual private firms was limited by law. Secondly, many very small contractors are not included. Registration with the office of the private sector in the MQH is required only to receive subcontracts from public sector contractors. Furthermore, there is the possibility that firms may be registered as something other than contractors in the commercial registry and tax office. In 1979 private sector contractors were estimated to be directly responsible for an output of LE 465 million, or about 34 percent of the industry's output (Table 1.2). When the output of the informal sector (estimated to be about LE 150 million) and the subcontracts that the private sector undertakes for public sector companies are taken into account, the private sector contribution to the industry's output was probably in the vicinity of 50 percent. This represents a major change from the late 1960's and early 1970's when the combined (local and foreign firm) private sector output was only about 20 percent of the industry's total (8).

Traditional Private Contractors

Local contractors in Egypt may be proprietorships, partnerships, and, less frequently, stock-issuing companies. Being rather small, they tend to specialize; more than half are classified as specialty and labor contractors who do concrete, masonry, carpentry, plumbing, electrical, and metal work. The larger firms of the sector tend to be more diversified in their services and act as general building contractors. About 10 to 15 percent of the contractors' work is in the non-building area, particularly in irrigation, water, and sewage works, and much less so in roads and bridges. There has been an

increasing tendency in recent years to register as a diversified contractor, rather than in the specialty and labor categories; many private contractors complained in author's interviews of a lack of good speciality subcontractors (76).

Although official statistics on the size of private contractors do not exist, it is known that these vary considerably from the very small to the very large. Table 3.9 shows the size of general contracts on the average (LE 94,000 in 1977) to be two to three times greater than specialty and labor contracts (LE 36,000). It is reasonable to assume similar disparities among the contractors themselves. Those working in the non-building area would be expected to be largest. In all government and much private sector work, private firms contract directly with the client; in public sector work, they are more likely to subcontract to public contractors. Labor contractors who assemble and supervise unskilled, day laborers, and provide them with minimal tools are prevalent in all types of construction.

Cooperatives

These organizations of mixed ownership were intended mainly to help small contractors. Small contractors formed cooperative societies in which local governorates participated with 50 or 51 percent of the capital. By joining a cooperative, private contractors could accept an unlimited volume of public work, thereby circumventing the ceilings on private contracting activity enforced by the Office of Private Contractors in the Ministry of Housing. Furthermore, they were accorded some advantages enjoyed by the public sector (such as exemptions from bid deposits and performance

TABLE 3.9

Contracts Signed by Private Contractors
For Public Sector and Government Work

Source: Reference (79)

| Year | General | Specialty | Labor | Total |
|--------------------|---------|-----------|-------|-------|
| Value (LE million) | | | | |
| 1975 | 100 | 21.5 | 27 | 148.5 |
| 1976 | 88 | 23 | 33.5 | 144.5 |
| 1977 | 97 | 26 | 37 | 160 |
| 1978 (June) | 82 | 23 | 25 | 130 |
| Number | | | | |
| 1975 | 1281 | 646 | 876 | 2803 |
| 1976 | 1250 | 782 | 856 | 2888 |
| 1977 | 1027 | 723 | 1015 | 2765 |
| 1978 (June) | 1220 | 512 | 842 | 2574 |

guarantees). In return, a percentage of their profits (3 to 7 percent), was returned to the cooperative, with the smaller contractors generally having to pay a higher percentage in exchange for involvement in large projects.

Cooperatives are normally managed by a board; the board chairman (who may or may not be a contractor himself) occupies a powerful position. The board at times allots work to cooperative members, acts as a management contractor, and assists members in acquiring financing and materials. In some instances, cooperatives are able to discriminate effectively against non-members, thus duplicating the barriers to competition which shield public sector firms.

Force Account Work

Another important, although small, segment of construction work is basic infrastructure work performed by certain government agencies as force-account work or for public or private sector owners, such as water and sewage connections and repairs, electrical and telephone lines and connections, roadway maintenance and repair, and railway line extensions. In 1979 this work was estimated to be worth approximately LE 50 million, or about 4 percent of the total output of construction.

Force account work is generally executed by local authorities under the technical supervision of the government. Once an owner requests installation and pays fees for a service, he must wait for local authorities to complete the project. Delays are frequent because of the lack of sufficient human, technical and financial resources at the local level. Efforts toward more realistic planning

and budgeting for utilities and other infrastructural services, and a clarification of the roles and responsibilities of local and central government would alleviate some of these difficulties.

New Private Firms

Beginning with the Open-Door Policy, foreign contractors penetrated the Egyptian market. These firms have found it advantageous to cooperate with local firms. One form this cooperation may take is for the local firm to act as an agent/representative for the multinational. Retained on a commission basis, the local alerts the foreign contractor about opportunities for work, assists in responding to calls for tender, and makes available personnel, subcontractors, and consultants on the specific jobs. Alternatively, local and foreign firms may enter into a joint venture; typically, each firm holds a percentage of the venture, the local firm subcontracts and the foreign firm manages the construction, provides necessary equipment, trains personnel, imports, and supervises. Occasionally, the local firm may operate as the main contractor and the foreign contractor as a specialized subcontractor. This was the case with the Maadi housing project built by Giza Co. Larsen and Nielsen, a Danish firm, was responsible for the supply of the prefabricated elements factory and the erection of the on-site units.

Both public and private local contractors are currently engaged in cooperative efforts with multinationals. Many firms had been established as joint ventures by the end of 1981 (see Table 1.4, Section 1.2). There were 122 companies licensed to operate in the field of contracting with capital assets valued at LE 114 million. If

we assume that the annual turnover for a contracting firm is about 3 times the value of its assets*, this indicates a construction capacity of some LE 340 million per year or almost three fourths of private sector output in 1979. However, only 48 of these firms with a combined capital of some LE 43 million were operational by the end of 1981. Table 3.10 shows that of these firms, 12 were fully owned by individual Egyptians and the remaining were joint ventures, mostly with partners from the Western countries.

Foreign firms operating in Egypt tend to be among the largest in the world. Although complete information is unavailable for all foreign firms, a breakdown of U.S. firms is available (Table 3.11).

Many firms still find it advantageous to form ventures for particular projects like the Giza/Tarmac/Cementation Co. venture formed to bid on the Intercontinental Hotel and the Arab Contractors/Tarmac joint venture (OSMAC) to construct the tunnel under the Suez Canal at Suez. The pervasiveness of this practice is evidenced by the fact that of the 22 U.S. contracting companies operating in Egypt, only 2 were operating on a permanent joint venture basis (15). While the local firm cannot, of course, necessarily enforce its preference for the form the cooperation should take, a more permanent arrangement would benefit the transfer of soft and hardware technology to these firms and should thus be encouraged.

* This assumption was advanced in Reference (22) based on norms in developed countries.

TABLE 3.10

Distribution of Projects in the Area of Contracting
Approved by the Investment Authority and Producing in Egypt
As of December 31, 1981

Source: Reference (3)

| Participants Nationality | Number of Projects | Paid in Capital |
|----------------------------------------------------|--------------------|-----------------|
| All non-Arab | 27 | 9,892 |
| of which: | | |
| American | 2 | 148 |
| Belgian | 3 | 140 |
| British | 8 | 1,880 |
| German | 2 | 890 |
| Italian | 2 | 890 |
| Swiss | 2 | 1,715 |
| Austrian | 1 | 400 |
| Luxembourgian | 2 | 1,000 |
| Dutch | 2 | 142 |
| Iranian | 1 | 750 |
| French | 1 | 175 |
| All non-Egyptian Arab | 9 | 4,481 |
| of which: | | |
| Saudi | 5 | 3,192 |
| Kuwaiti | 1 | 720 |
| Iraqi | 1 | 350 |
| All Egyptian Contribution | 48 | 28,428 |
| of which: | | |
| Egyptian Alone | 12 | 9,962 |
| All projects | 48 | 42,806 |
| Size of project by paid in capital in (1000 LE) | | |
| 1500+ | 8 | 18,100 |
| 1000-1499 | 12 | 12,722 |
| 500- 999 | 11 | 7,332 |
| 250- 499 | 10 | 3,412 |
| 100- 249 | 7 | 1,240 |
| 1- 99 | 0 | |

Table 3.11

Characteristics of US Contractors
Working in Egypt During 1981

Source: Reference (15)

| (1) Turnover \$Million | # of Firms | | Type of Work Carried Out(2) | | | | | | | | |
|------------------------------|---------------------------|---------------------------|-----------------------------|------|-----|-----|-----|-----|------|-----|----|
| | <u>in</u> <u>Egypt</u> | <u>in</u> <u>Total</u> | CM | BLDG | MFG | PWR | ARP | HWY | PROC | MAS | D |
| 5,000+ | 4 | 6 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 3,000-4,999 | 4 | 5 | 3 | 1 | 4 | 2 | - | - | 4 | - | 4 |
| 2,000-2,999 | 3 | 6 | 2 | - | 2 | 3 | 1 | 1 | 3 | 1 | 3 |
| 1,000-1,999 | 3 | 12 | 3 | 2 | 3 | 3 | 1 | 1 | 3 | 1 | 3 |
| 250-999 | 2 | 53 | 2 | 2 | 1 | - | 2 | 1 | 1 | 1 | - |
| 100-249 | 3 | 113 | 2 | 1 | 3 | 2 | 1 | 1 | 3 | 2 | 2 |
| 50-99 | 2 | 149 | - | 1 | 2 | 1 | - | - | 1 | - | 1 |
| 30-49 | 1 | 56 | - | 1 | 1 | 1 | - | 1 | 1 | - | - |
| Total | 22 | 400 | 16 | 12 | 20 | 16 | 9 | 9 | 5 | 11 | 16 |

(1) Turnover: This figure includes prime construction contracts, shares of joint venture, subcontracts, design-construct and construction management contracts where the firm is exposed to financial liability similar to a general contractor.

(2) CM = Construction Management, BLDG = Building, MFG = Manufacturing, PWR = Power, ARP = Airports, HWY = Highways and Bridges, PROC = Process, MAS = Massive Works, D = Design Work

The type of works listed here, for each contractor have been chosen by the firms responding to the ENR questionnaire themselves.

3.4.2.3 Operations of Contractors

Registration

To qualify for work in the formal sector in Egypt, all contractors, regardless of ownership or legal status, are required to register with the Commercial Registry. The application requires basic data about the firm, such as date of establishment, type of firm, and the address of the main office. The local Chamber of Commerce is the body responsible for reviewing these applications, and based on its certification, the Commercial Registry issues a registration number to the firm. Chamber of Commerce requirements for registration are minimal. To qualify, a firm either must be owned by a qualified engineer, own the equipment/tools necessary for the trade, or have worked for public sector firms in the past (80). To work for the private sector a firm need not necessarily have obtained this commercial registration, although, the government has made delivery of the materials it controls (glass, wood, etc.) to any firm contingent on this registration. Small firms manage to perform work for private clients without official registration, especially on small jobs, by relying on the client or on the black market to secure building materials (31).

To perform work for the government and for public sector firms, private contractors traditionally have also been required to register with the Office of Private Contractors in the Ministry of Housing. This office's primary responsibility was to monitor their work and to ensure that these firms did not exceed the annual ceiling on private sector activity. Each contractor, after registering with the Commercial Registry, had to apply separately to this office, where

immediately a file would be opened. Each time a government or public sector client intended to sign a contract with a private firm, he was required to ask the private contractor's office for approval. Secondly, the office also keeps on file a performance evaluation sheet submitted with notice of completion of each contract. Because the main task of this office was to monitor the ceiling on private contractors, it is dubious that evaluation procedures were being closely followed. Finally, contractors must register with client agencies. Most government agencies advertise annually for interested contractors to register with them so that they might take part in competitions launched by those agencies. Despite registration requirements, prequalification procedures are arbitrary. First, public contractors, owned and guaranteed by the government, do not have to go through the same procedures as private contractors to qualify. Second, there is no formal classification of what constitutes being qualified to perform the work in question for the client agencies.

Contracts

Traditionally in Egypt, contracts have been awarded after a competition among contractors. Lump sum or unit price remains the standard form of contract for all clients; the bill of quantities generally is given to the contractor in the tender documents. Labor costs and materials prices are thus set at the start of the contract. Inadequacies in the codes and specifications make the relationship between the professional and contractor especially important. Often, change orders are a burden on the contractor. Also, the contractor may perceive delays in project execution as due to the professional's

failure to deliver the plans. These difficulties tend, unfortunately, to lead to a somewhat adversarial relationship.

In public/government work, letters of guarantee are required: 2 percent on the bid which is raised to 5 percent upon contract award, and an additional 5 percent is retained during construction. One full 5 percent is paid upon project completion, and another 5 percent after one year. A 10-year guarantee is required on the facility. For an unknown company, 35 percent or more of the value of these guarantees may have to be backed by LE in the bank. As the company becomes established, that figure falls to 20 or 25 percent. The exact amount varies with the level of the company's assets which might be used as collateral. Private clients often do not require such guarantees, relying instead on a firm's reputation.

The contractor must provide insurance for labor and equipment, which represents about 3 percent of costs; the owner of any structure over LE 10,000 must provide liability insurance to protect himself and third parties for at least 10 years after construction. Civil law holds the contractor and professional liable for building collapse for 10 years, for which contractors usually carry sufficient insurance.

Until recently, public sector contractors were largely free from competition with the private sector. Public/government contracts were awarded to the public sector through direct orders on a cost plus overhead and profit basis. Final figures were agreed upon during construction by representatives of the MOH, the client, and the contractor. The government exerted little control over

the contractor, due to a serious shortage of qualified supervisory personnel. Inadequate project preparation, poor contractor performance, extended project duration, and lack of incentives to control costs exacerbating already rising prices prompted a directive in late 1977 to return to competitive bidding in public/government work. Shortly thereafter, the ceiling on contract volumes awarded to private contractors was eliminated. While the 1962 Decree on direct orders is still in force, public and private sector contractors are supposedly on more equal ground to compete for public/government contracts, with the increased competition hopefully leading to greater efficiency and price stabilization on the part of the contractor and improved project/budget preparation on the part of the client. Public sector contractors may still be exempt from letters of guarantee/bonding in government work, although they face the same requirements as private contractors in public work.

Projects initiated under the foreign investment law generally have time and quality controls currently not required by other projects in Egypt, and have clients less constrained by government bureaucracy. In these ventures, the foreign multinational assumes responsibility for training local personnel provided by the local partner, providing/advising on the imported materials and perhaps, equipment for purchase by the local, and guaranteeing the performance of those portions of the job which the local firm does not have experience in handling, such as mechanical erection, special finishes, and other special works.

The basic contractual arrangements required for this work are similar to those for locally executed work, but a bit more rigid. The main contractor issues a letter of guarantee to the client, and the subcontractors, in turn, issue the same to the main contractor. The responsibilities of the main and subcontractors may be both stated in the contract with the client, or in their separate contracts. Most contracts are on a fixed price or unit cost basis, although they usually have escalation clauses. Advance payments are lower than for local contractors, only 10 to 15 percent of the contract. Foreign contractor's insurance is more common and more comprehensive than that held by their local counterparts.

Informal Sector

Informal sector construction, which consists mostly of housing in urban areas, is defined as all construction carried out without obtaining clear title to the land and building permits and licenses. Contractors in the sector divide into two types, large and small. The large contractors of the informal sector also engage in real estate development and customarily build 3 to 5 story walk-up buildings for rental. The smaller ones are usually experienced craftsmen who head a labor team. Large contractors, like their counterparts in the formal sector, erect structures of reinforced concrete skeleton and brick in-fill, especially in urban areas. Small structures are built to suit individual needs by labor teams and/or small specialty contractors, depending upon the materials used to erect the walls -- mud bricks, rammed earth, or red bricks -- and the roof -- woven matting, asbestos, or reinforced concrete. Reinforced concrete roofs and even red bricks

require a rather skilled team of laborers. Despite owner involvement in projects built by a small contractor, limited funds force the adoption of low structural standards, which in turn result in very low quality construction. Concrete is usually inadequate due to badly graded aggregate, poor framework, and even inadequate placing and mixing of concrete which causes overdrrips and waste, and hence pushes up costs.

Prefabrication

The government first industrialized housing production in 1972 to meet the growing demand for low cost housing by introducing fully prefabricated large-panel housing. Facing rising costs, a factory was purchased from East Germany, and a new company was formed to produce the housing under the auspices of the Ministry of Industry. In 1974, the government expanded this program. The existing company was transferred to the Ministry of Housing, and nine more factories were purchased for nine separate public sector contractors. In 1977, when a final factory was contracted, eleven public sector companies had a planned capacity of over 20,000 housing units per year (see Table 3.12). These factories, scheduled to be completed in six months, were delayed, however, and at the end of 1978, only three were operational. Only a few hundred housing units had been erected. The latest cost projections suggest that this housing may lie in the range of medium to high income rather than low income. With the return to competitive bidding, this scheme will have difficulty achieving its goals. Studies have recommended diverting the factor output to new cities and other types of buildings (31).

The use of concrete structures in urban buildings

TABLE 3.12

Eleven Prefabricated Housing Plants Planned for Egypt

Source: Reference (36)

| Egyptian Company Undertaking Project | Foreign Supplier | Location of Plant |
|--------------------------------------------------------|---------------------------------|----------------------|
| 1. Prefabricated Houses Co. | Mash Export (East German) | Helwan |
| 2. Arab Contractors Co. | Setip (Swiss) | Heliopolis |
| 3. El Nasr Co. for Building & Construction (Egyco) | Lambert (French) | Helwan |
| 4. General Contracting Atlas Co. | M.I.T. (Austrian) | Hacsteppe |
| 5. El Nile General Co. for Concrete (Spico) | Lambert (French) | West Helwan |
| 6. El Nasr General Co. for Contracts (Hassan-Allam) | Tracoba (French) | Alexandria |
| 7. Cairo General Co. for Contracts | Hirondale (French) | Cairo |
| 8. El Gomhuria General Contracting Co. | Kesting (German) | Suez |
| 9. Misr Concrete Co. | Larsen & Nielsen (Danish) | Ismailia |
| 10. General Co. for Construction (Rolin) | German Consortium for Prefab | Belbeis |
| 11. Giza Co. for Contracts | Larsen & Niesen (Danish) | Giza Governorate |

is widespread. The nationalization of contractor and materials suppliers in the 1960's created a preference for the technologies that made maximum use of regulated building materials, regardless of the availability of other, more appropriate technologies.

Taxes

Taxes for contractors have long been a much debated issue in Egypt. Each commercial entity whose capital exceeds LE 2,000 (raised to LE 10,000 under the new law) is required to keep regular accounts certified by an accountant. Net profit is calculated after deducting all expenses, including deduction of reserves of up to 5 percent of net profit. The commercial and industrial tax represents 32 percent of this profit (down from 39.7 percent). For proprietorships and full partnerships, the sum remaining after the commercial and industrial tax has been deducted is subject to a graduated, general income tax, which can quickly become a sizeable tax burden for prosperous contractors. Dividends paid by limited partnerships or corporations are taxed as income from movable capital at a rate of 32 percent, even though this tax is deducted when calculating taxable income for the commercial and industrial tax. Each limited partner or shareholder also pays a general income tax on his total earnings. For contractors who do not keep books and records, the Tax Office assumes 5 percent of total income to be taxable profit. Income earned abroad is not taxed unless the contractor is operating out of an office in Egypt.

Profits of public sector contractors earned inside Egypt are taxed under the commercial and industrial tax at a rate of 32 percent as are those of any shareholding firm. There are differences,

however in allowable deductions as defined under various tax laws and the Unified Accounting System (9). After subtracting direct and indirect costs, for example, public contractors are allowed to deduct up to 5 percent of net profit for general reserves and the purchase of government bonds, 5 percent of legal reserve, 5 percent hedge against inflation in equipment prices, and 10 percent as a capital increase. Profits on the completed portion of projects which are less than 50 percent complete are also not taxed. This may induce contractors to initiate but only half complete many contracts.

Other practices under the Unified Accounting System tend to lead to higher overheads for the public sector contractor. Inventories are valued on the basis of average price during the fiscal year rather than client purchase price. Most construction equipment is depreciated on a straightline basis over five years, after which it is reevaluated and redepreciated (54). Profits after taxes enter retained earnings or reserves of the company for use in future investment, losses, and so forth. A summary of this accounting system and the problems it presents for contracting can be found in Appendix II.

3.5 CONSTRAINTS ON PROJECT DEVELOPMENT

In Egypt today many constraints inhibit project development in the inception, planning, and execution phases. One major obstacle is government regulation. Intended chiefly to control the distribution of government-owned resources, government regulations have not been conducive to the implementation of a continuing and stable strategy for construction. The lack of a land development policy has exacerbated the problem of land availability and complicated the process of obtaining

building permits. Specifications by which to set standards are inadequate and sometimes non-existent. For example, specifications for residential buildings concentrate more on tangible properties of the physical structure than on the more important issue of matching user needs with the provision of affordable housing.

This attention to detail and measures to control market forces, especially on the supply side, increase the effort required for project initiation and do not solve the problems associated with real resource shortages. Government control over construction, mainly through appropriation of the necessary yearly budget allocations, affects projects already underway and those in the planning stages. Financing decisions have a great impact on large projects which extend over a period of more than one fiscal year, since government priorities change from year to year, thereby affecting the expenditures available for the projects.

A second constraint on construction projects in Egypt is financing. For private sector clients, securing long-term financing necessary for projects is a cumbersome process requiring the interaction of many government agencies. For a private client to start a factory in one of the governorates of Egypt, he first must obtain the approval of the Ministry of Industry, who determines if the project is compatible with the laws and regulations designed to promote public sector industry. Then, the Ministry communicates with the governorate to ascertain whether that governorate has funds allocated in its budget allowing the client to expend money and invest in that project. In making this determination, the governorate usually requires an estimate from the

client, who therefore has to hire a professional architect or engineer to undertake a preliminary design.

Even after preliminary approval is given and the banks have agreed to extend financing for the project, the contractor must secure a building permit and the allocation of regulated building materials. Potential delays in securing these requirements threaten the project. Should so much time lapse before the contractor can begin work that the project cannot be completed within the fiscal year for which funds were appropriated, the client may not have sufficient funds to pay the contractor in full, thus augmenting the contractor's financial burden. Public as well as private contractors experience problems with government and public clients. A recent study conducted by the Ministry of Housing showed that the 29 contracting firms under its supervision were owed LE 96 million by the government in 1976 (59). These financial problems may in part be a reflection of inadequate project planning and feasibility studies which results in inaccurate estimates of project duration and cost, especially serious in view of the fact that on many projects, contractor entry is relatively late.

A third obstacle to project development in Egypt is the separation between professionals and contractors which delays the contractor's entry onto the project and precludes his input. This input can sometimes defray both project cost and completion time. This separation further complicates the process of making changes during project execution, as all participants must agree to them. This may increase friction between the two teams, especially when the professionals are also responsible for the supervision of construction.

The separation also works against and even discourages innovation. The contractor may be reluctant to initiate or accept changes, since to do so, he would have to convince the client and his representative, the professional. Innovation may be further discouraged by the lack of incentives provided in client contracts. Often, the contractor is not allowed a share of the savings on project costs which he has produced. The standards and specifications in use in Egypt also dissuade new ideas and techniques, as they do not allow for these ideas to be tested or implemented.

Specifications can also be a source of delay or result in increased costs by specifying materials that may not be readily available in the market, or by requiring the rigid adoption of certain architectural details that might complicate execution of the project. Also, specifications exist for only a small number of construction activities which makes controlling the quality of the other activities more difficult, facilitates cheating, and may even present safety problems. Moreover, the lack of specifications of allowable tolerances in the dimensions, stresses, and other features undermines the on-site quality control inspection process. This leaves the decision to approve or reject construction work to the discretion of the parties involved.

The lack of specifications also delays the delivery process. These delays usually tie the contractor to the site physically as well as financially, placing greater strains on the cash flow situation of the contractors. Securing short-term financing has been difficult for both private and public sector contractors who must compete for bank credits with other sectors of the economy. The financial burden on contractors

has been increased by the problems in securing advanced credit from suppliers of building materials and main contractors.

The need to modernize project execution brought on by changes in Egyptian resource markets is challenged by the lack of personnel trained in using and maintaining unfamiliar equipment. Such changes require the use of more sophisticated-trained personnel on site and the development of different types of management skills. The lack of such expertise in contracting firms, especially in smaller ones, may constitute a major bottleneck in the firm's efforts to enlarge its activities and may even result in inadequate preparation for projects. Small modern tools, for instance, are not used on project sites. Moreover, contractors often centralize their modernization efforts in separate stages of project activities, such as in the lifting and pouring of concrete, while it is seldom the case to spread the use of mechanical hammers or cement guns for plastering.

Small private sector contractors informally exercise personal control over their projects by physically visiting the sites. Keeping no formal records, they control their projects by relying on individual ability and experience, which varies from case to case. On larger and more complex projects the need for formalizing such control techniques becomes more evident, highlighting the need for better information flow and communication.

The control systems currently used by the contracting firms make adapting to and incorporating changes in the plans for the firms virtually impossible. This may be a result of an inadequate assessment of the interdependence between the needs of the performed activities and

the use of the various resources. Future benefits are usually traded for short-term results. Examples of this pattern are inadequate maintenance of equipment and inefficient use of labor. This tension is also reflected in the handling of building materials on site. The understatement of the amount wasted, and/or the failure to recognize all the variables affecting the performance on the projects, leads to cost increases due to mishandling or poor storage of the materials. Such issues among others, further limit the ability of the contractor to plan or even adjust reasonably to changes in the resource market.

As discussed earlier, the lack of adequate standards and specifications makes enforcement of quality control in general somewhat arbitrary. The contractors, however, do not seem to be requiring quality of their project teams. No internal quality control standards exist and testing when practiced is very limited. This lack of enforcement and the low priority attributed to quality leads to potential delays, complicates the relation between the contractors and the other parties involved in the project, and even leads to the necessity for larger factors of safety (i.e. increased project costs) in the design and execution of the work.

The project team set-up, because it is temporary, adds another dimension to the above problems -- that of human relations. The project-oriented organization of smaller firms inhibits a sense of belonging among the project personnel, especially on projects of short duration. Such human relations are vital to the success of any control system, yet project personnel express multiple loyalties to various firms, departments, and even participants. Coordination among all these

parties might require the consideration of new forms of organization for contracting firms, such as matrix organizations, whereby project managers play a major coordinating role among the various interests in the firm.

A major problem, however, still stands in the way of successful project management in Egypt, the integration of control into a continuous cycle of planning, control and feedback. This is made impossible by the record-keeping and the data handling in the firms. Improvements in the record-keeping of firms is essential for communicating information among firm levels and also for establishing plans and measuring variations, leading finally to defining those areas which require action. The lack of such records and the inadequacy of data collected limits the effectiveness of the actions taken by project teams on site. For instance, non-use of equipment operating control cards complicates exact cost calculation for projects, inhibits equipment policy in the firms, and may even undermine the ability of a firm to obtain new work.

The above constraints in Egyptian construction lead to cost increases as well as project delays. They foster dishonest practices and low quality work, inhibit innovation, and encourage black markets and informal building practices.

CHAPTER IV
CONSTRUCTION RESOURCES

For construction demand to be realized, actual resources have to be transformed into constructed facilities. Physical and managerial problems plague various resource markets in Egypt, causing endless bottlenecks, delays and price increases. This chapter investigates construction resources in Egypt: specifically building materials, labor, equipment, and finance. First it analyzes the translation of construction demand into resources. It then analyzes in detail the supply situation of each of these resources; and finally, it identifies the problems that exist in matching supply and demand, and details recommendations to alleviate them.

4.1 DEMAND FOR RESOURCES

4.1.1 Building Materials and Labor

Like demand for construction itself, accurate figures on the demand for resources in Egypt are hard to obtain. The Ministry of Planning in Egypt estimates demand for key materials, mainly cement and steel, by using coefficients. These relate the consumption of the material for each LE 1 million of total construction. All research to date reveals that the coefficients they use are inaccurate. Based on old requirements of housing construction (22, 31), these coefficients ignore the differences in resource requirements between housing and other types of construction. Furthermore, their update to account for price changes is unreliable because of the lack of adequate cost indices for construction.

We have based our estimates on the coefficients advanced by the most recent study of the industry, Construction/Contracting Industry Study (Reference 22). These coefficients are more realistic than those used by the government. Nevertheless, they do not take into account changes in design, construction methods, industry efficiency or construction costs, which would tend to create savings in the demand requirements for labor and materials. Thus the coefficients should represent the upper limit on demand values.

Table 4.1 estimates sectoral coefficients of cement, reinforcing steel and labor. Coefficients for other materials are generally not available or reliable. The brick consumption coefficient has historically been related to cement consumption. Booz, Allen and Hamilton in their 1977 study suggested a coefficient of some 490 bricks-per-ton of cement (20). The National Housing Policy Study in 1978 estimated a coefficient of 450 bricks-per-ton of cement (34). Demand for finishing materials was usually not estimated for construction output in any systematic way.

Using the coefficients in Table 4.1 together with the construction desired demand of Table 2.19, we calculated the expected demand for cement, reinforcing bars and labor (Table 4.2). The average of estimates for labor demand is exactly the same coefficient as that developed by the Ministry of Housing Training Organization, a fact that should increase our confidence in the coefficients we are using.

4.1.2 Construction Equipment Demand

Ten major categories of construction equipment can be identified. As might be expected, the distribution of the equipment

TABLE 4.1

Technical Coefficients for the Various Sectors
 For Selected Resources
 For each LE 1 Million in 1979 Prices

Source: Reference (22)

| Sector | Cement (tons) | Reinforcing Steel (tons) | Labor (man-years) |
|----------------------|------------------|-----------------------------|----------------------|
| Land | 1200 | 150 | 250 |
| Industry | 4500 | 900 | 270 |
| Transport | 1600 | 370 | 250 |
| Utilities | 2500 | 500 | 350 |
| Housing | 3200 | 385 | 320 |
| Building | 3200 | 385 | 320 |
| Allowances: % | | | |
| Loss in Transit | 10% | 2.5 | - |
| Indirect Consumption | 15% | 2.5 | - |
| Unspecified Use | 10% | 7.5 | 10 |

TABLE 4.2

Estimate of Cement, Reinforcing Steel, and Labor Requirements
for 1980-84 Construction

Source: Reference (22)

| Year | Expected Construction Output LE Million 1979 | Cement 1000 T | Reinforcing Steel 1000 T | Labor 1000 man-years |
|------|----------------------------------------------------|------------------|-----------------------------|-------------------------|
| 1979 | 1,450 | 5,186 | 700 | 472 |
| 1980 | 1,643 | 5,974 | 804 | 536 |
| 1981 | 1,690 | 6,137 | 831 | 551 |
| 1982 | 1,789 | 6,428 | 872 | 577 |
| 1983 | 1,913 | 6,898 | 942 | 620 |
| 1984 | 2,055 | 7,402 | 1,014 | 665 |
| 1989 | 2,965 | 10,673 | 1,463 | 961 |
| 1994 | 4,560 | 17,283 | 2,387 | 1,497 |

among each sector, as shown in Table 4.3, corresponds closely to the requirements of the construction types with the land sector for example holding 64 percent of the excavation equipment, and building 50 percent of the piling equipment.

The Construction Industry Study, based on the 1978/79 census of imported equipment, customs returns and analysis of the 29 public sector companies and other mixed sector contractors, has concluded that approximately two-thirds of the total 1978 demand was generated by the mixed and government sectors. The local private sector contractors, however, were the largest purchasing 1900 pieces of equipment valued at LE 139 million (22). This trend is expected to continue over the next few years.

Given the size of the industry's equipment holdings (30,000 pieces), it can be expected that future equipment demand will be for replacement and modernization. This is especially true because of low equipment usage rates in many sectors, as will be investigated more fully later.

Traditionally, meeting the demand for equipment in the industry presented problems. Obtaining foreign exchange for the purchase of equipment (mostly all imported) and spare parts was difficult, and once obtained, the equipment was maintained and operated inefficiently. These factors usually combined to inflate demand. New equipment had to be purchased more frequently, and spare parts were bought in abundance as a precaution against any future uncertainty in access to the required foreign exchange. The reluctance to import second-hand equipment and the lack of equipment hire operations in Egypt

TABLE 4.3

Distribution of Equipment Holding by Sector

Source: Reference (22)

| | Total Number | Land | Industry | Transport | Public Utilities | Housing | Other Building |
|----------------------|--------------|------|----------|-----------|------------------|---------|----------------|
| Earthmoving | 4,432 | 22% | 13% | 20% | 15% | 15% | 15% |
| Excavation | 1,674 | 64% | 6% | 6% | 8% | 11% | 5% |
| Piling | 175 | -- | 10% | 5% | 5% | 30% | 50% |
| Concrete Plant | 8,847 | 3% | 3% | 21% | 26% | 32% | 16% |
| Lifting Eqpt | 972 | 1% | 12% | 17% | 21% | 26% | 13% |
| Road Making Plant | 1,647 | 5% | 5% | 70% | 10% | 5% | 5% |
| Pumping | 4,440 | 30% | 10% | 15% | 12% | 15% | 8% |
| Compressed Air | 1,138 | 3% | 16% | 25% | 18% | 24% | 12% |
| Gen'rs & Weld'g etc. | 2,591 | 2% | 17% | 12% | 20% | 26% | 13% |
| Transport | 3,473 | 20% | 14% | 20% | 16% | 20% | 10% |
| Total | 29,494 | | | | | | |

also added to overestimating demand for equipment. Anticipating an improvement in the use and replacement of equipment, the construction industry study estimated the demand for new equipment through 1985 (see Table 4.4).

4.1.3 Demand for Finance

Finance for the construction industry is required for the actual construction of the facilities required in the form of funds for owners to pay contractors and suppliers of resources; but funds are also required for capital investment in the industry, specifically for plants to produce building materials, training centers to train labor and purchases of construction equipment.

4.1.3.1 Construction Finance

Table 2.19 with the expected output of the industry beginning in 1980 estimated the amounts of financing needed by both the public and private sectors of the economy. These estimates were developed to avoid problems inherent in official government plans, in which the allocation process is hindered by: a lack of adjustment for inflation, inadequate provisions for maintenance and repair, no provisions for interest on debt owed to contractors, and no contingency allowances for projects that are not included in the plans. Including all these factors raises the expected output of the industry. In 1980, it went from the LE 1,453 million to LE 1,643 million.

4.1.3.2 Investments in Building Materials

The government's plans for the continuation and expansion of local production of certain building materials relies mainly on the public sector for more than three-quarters of its total

TABLE 4.4
 Estimated Equipment Need
 for Replacing the Construction Industry Fleet

Source: Reference (22)

| Type | Year | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|----------------------|------|------|------|------|------|------|------|
| Earth moving | | 226 | 145 | 172 | 404 | 1329 | 879 |
| Excavation | | 360 | 50 | 14 | 132 | 332 | 395 |
| Piling | | 80 | 21 | 6 | 13 | 26 | 5 |
| Concrete Plant | | 1000 | 610 | 552 | 1357 | 1864 | 2081 |
| Lifting | | 17 | 3 | 20 | 194 | 172 | 218 |
| Road making | | 24 | 54 | 147 | 285 | 194 | 460 |
| Pumping | | 1500 | 361 | 484 | 509 | 469 | 531 |
| Compressed Air Plant | | 161 | 25 | 72 | 184 | 216 | 180 |
| Generators & Welding | | 149 | 149 | 133 | 256 | 483 | 451 |
| Transport | | 50 | 46 | 146 | 813 | 615 | 840 |
| Total | | 2667 | 1464 | 1746 | 4147 | 5700 | 6040 |

investment. The majority of the investment demand comes from the production of cement, followed by reinforcing steel and finally bricks and blocks. These sum of these figures, which should be considered only illustrative, are provided in Table 4.5.

4.1.3.3 Investments in Labor Training

Part of the demand for labor is expected to be met by increasing efforts in training. The Ministry of Housing (TOMOHAR) had planned to: establish 62 training centers in five years to train an average of 50,000 workers per year and another three training centers to train 600 instructors per year. The total cost of this project including operating expenses was estimated in 1975 prices to be LE 45.4 million. Delays in the provision of government finance have slowed this program; only 16 training centers and 2 instructor-training centers were operational in 1979. Based on adjusted completion schedules and an average annual inflation rate of 20 percent, the fund requirements of the training program have been estimated in 1979 constant prices (Table 4.5).

4.1.3.4 Funds for Equipment Purchases

The funds necessary to purchase the equipment required in Table 4.4 are shown in Table 4.5. These funds are almost entirely in hard currency. These figures include a 10 percent adjustment for spare parts both for the new equipment as well as the existing fleet.

4.2 RESOURCES SUPPLY

In response to the increasing demand for construction resources in Egypt, there has been an increase in their supply through local

TABLE 4.5

Total Requirements of Funds
to Finance Construction Program

(in 1979 LE Million)

| | 1981 | 1982 | 1983 | 1984 | 1985 |
|---------------------------------------|--------|--------|--------|--------|--------|
| Construction Projects ⁽¹⁾ | 1690.0 | 1789.0 | 1813.0 | 2055.0 | 2199.0 |
| Building Materials ⁽²⁾ | 437.0 | 365.0 | 257.8 | 145.7 | 118.7 |
| Labor Training ⁽²⁾ | 4.4 | 3.0 | 2.8 | 2.8 | - |
| Construction Equipment ⁽³⁾ | 34.0 | 47.3 | 143.5 | 222.6 | |
| Grand Total | 2165.4 | 2204.3 | 2173.6 | 2426.1 | 2548.2 |

Sources: (1) from Table 2.19

(2) from Reference 22

(3) from Reference 22, but adjusted by 10 percent to cover spare parts.

production, and importation. This increase however has not been without problems. There have been, and continue to be, sporadic shortages which have caused prices to rise. While labor shortages have been mostly due to migration, cement and steel difficulties were caused by production and regulation problems, and brick shortages from the Nile silt problems. This section will highlight the major problems in the supply of resources.

4.2.1 Building Materials

With the exception of timber, Egypt produces the entire spectrum of building materials. This production is supplemented by imports from abroad to satisfy the requirements of the market. Materials in Egypt are classified as either main or secondary materials according to their use. Main materials are used in structures and partitions, while secondary materials have other uses. Main materials in turn can further be broken down into natural and manufactured materials. Natural materials include sand, gravel, and stones, while manufactured materials encompass cement, steel and bricks. The secondary group includes the remaining materials, such as paints, sanitary fittings, and pipes. For reasons of brevity and data availability, discussion here is limited to three main manufactured materials and one secondary material, specifically, cement, steel, bricks and gypsum.

4.2.1.1 Cement

Production

Cement in Egypt is entirely produced by four public sector companies: Tourah, Helwan, National, and Alexandria. In 1979 Tourah's

6 kilns produced 886,000 tons of cement, Helwan's nine produced 1,103,000 tons, and National and Alexandria both had 3 kilns, with National producing 494,000 tons and Alexandria 498,000 tons. All kilns utilize the "wet process." Each company's output has declined steadily over the past ten years (Table 4.6).

The historical development of the production and trade in cement is well summarized in Table 4.7 compiled by a MIT/Cairo University team (33). Production rose except for brief periods, from the mid-1950's until the early 1970's, when there was a downward turn. This recent downturn can be attributed to equipment obsolescence and a lack of spare parts. The 1973 War and the shortage, at the time, of paper sacks also aggravated this slowdown. This fall in production and continued increase in demand caused cement imports to rise to more than one million tons per year, while cement exports decreased to almost nil, thus converting Egypt from a net exporter to a net importer of cement. This situation is expected to persist until the factories already producing cement renew their equipment and the new factories currently in the planning and construction stages come on line.

Egypt's cement problems, however, go beyond the lack of existing production capacity. Since 1961, both the production and distribution of locally produced as well as imported cement have been controlled by the government. In addition to the production by the four public sector companies, distribution, import and export had been handled solely by the Egyptian Cement Office (ECO) which is also state owned. This control, which was intended to enable the government to increase the availability of cement in Egypt for the development plan, has caused some adverse side effects.

TABLE 4.6

Summary of Cement Production
of the Four Public Sector Companies.

Source: Reference (33)

| Year | Actual Cement Production (in 1000 tons) | | | | Total |
|----------|-----------------------------------------|------------|--------------|----------------|--------|
| | Tourah Co. | Helwan Co. | National Co. | Alexandria Co. | |
| 1970/71 | 1320 | 1333 | 635 | 524 | 3812 |
| 1971/72* | 1970 | 1931 | 1038 | 828.5 | 5757.5 |
| 1973 | 1236 | 1203 | 669 | 509.5 | 3617.5 |
| 1974 | 1086 | 1083 | 611 | 482.5 | 3262.5 |
| 1975 | 1167 | 1179 | 705 | 525.5 | 3576.5 |
| 1976 | 1053 | 1116 | 661 | 533 | 3363.0 |
| 1977 | N.A. | N.A. | N.A. | N.A. | N.A. |
| 1978 | N.A. | N.A. | N.A. | N.A. | 2951.0 |
| 1979 | 886 | 1103 | 494 | 498 | 2981.0 |

*Figures for 18 month period. Fiscal year has been changed since 1973 to coincide with calendar year.

TABLE 4.7

Figures on Production, Trade, and Consumption of Cement
Felt to be Representative of the Egyptian Situation
Being Derived from a Variety of Sources

(Units are 10³ Metric Tons)

| Year | Averaged ⁽¹⁾ Production | Averaged ⁽¹⁾ Imports | Averaged ⁽²⁾ Exports | Calculated Consumption | Averaged ⁽³⁾ Consumption |
|------|---------------------------------------|------------------------------------|------------------------------------|---------------------------|----------------------------------------|
| 1951 | 1075 | - | - | - | - |
| 1952 | 950 | 12.00 | 19.0 | 943 | - |
| 1953 | 1080 | - | - | - | - |
| 1954 | 1224 | 7.143 | 167.8 | 1063 | 1027 |
| 1955 | 1370 | - | - | - | - |
| 1956 | 1345 | - | - | - | - |
| 1957 | 1415 | 21.30 | 218.7 | 1218 | 1246 |
| 1958 | 1511 | 9.527 | 217.9 | 1303 | 1286 |
| 1959 | 1716 | 6.692 | 415.8 | 1307 | 1278 |
| 1960 | 2052 | 7.000 | 352.9 | 1706 | 1525 |
| 1961 | 2218 | .984 | 605.9 | 1613 | 1453 |
| 1962 | 2321 | 1.613 | 419.5 | 1903 | 1744 |
| 1963 | 2499 | 13.49 | 218.0 | 2294 | 2229 |
| 1964 | 2510 | 100.0 | 178.3 | 2432 | 2360 |
| 1965 | 2433 | 246.2 | 290.0 | 2389 | 2355 |
| 1966 | 2627 | 162.2 | 339.2 | 2450 | 2383 |
| 1967 | 2769 | 180.5 | 419.7 | 2530 | 2337 |
| 1968 | 3163 | 1.192 | 774.5 | 2390 | 2468 |
| 1969 | 3570 | 2.889 | 759.3 | 2814 | 2755 |
| 1970 | 3689 | .717 | 625.4 | 3064 | 2915 |
| 1971 | 3878 | .067 | 998.1 | 2880 | 3006 |
| 1972 | 3831 | 1.830 | 856.7 | 2976 | 3081 |
| 1973 | 3605 | 1.667 | 542.5 | 3064 | 3038 |
| 1974 | 3262 | 1.110 | 190.1 | 3073 | 3088 |
| 1975 | 3673 | 906.7 | 123.5 | 4456 | 3915 |
| | 3673 | 193 | 123.5 | 3743 | 3668 |
| 1976 | 3364 | 1255 | 29 | 4590 | 4520 |
| | 3364 | 791 | 29 | 4126 | 4140 |
| 1977 | N.A. | N.A. | N.A. | N.A. | N.A. |
| 1978 | 2951 | N.A. | N.A. | N.A. | N.A. |
| 1979 | 2981 | N.A. | N.A. | N.A. | N.A. |

Note: For each column labeled "averaged", the data from the appropriate sources was adjusted to a calendar-year basis if necessary (by averaging the surrounding fiscal years, e.g., data for 1969/70 and 1970/71 was averaged to obtain data for 1970), and then all data was averaged to obtain the representative set of calendar year figures given in the table. Some wide differences occurred in the 1975 and 1976 import and consumption data. In each case, the data was thus handled as two distinct sets, a high and a low set, each being presented in the table. According to the Ref., the higher set of figures, that are given first in the table, is more likely correct.

The column labeled "calculated consumption" is simply averaged production plus averaged imports minus averaged exports, under the assumption that change in inventories has been negligible.

Source: Reference (33) Original sources listed below:

- For (1) Central Agency for Public Mobilization and Statistics, Egyptian Cement Office, Federation of Egyptian Industries, General Organization of Industrialization, Institute of National Planning, Ministry of Planning
- For (2) Same as for (1), and the Ministry of Housing and Reconstruction.
- For (3) Central Agency for Public Mobilization and Statistics, Egyptian Cement Office, Institute of National Planning, Ministry of Planning.

Recent declines have occurred in the efficiency of cement production, despite no apparent problems in the quantity or quality of its raw materials. This decline has been documented in several studies by comparing actual production to planned production. Taking the national planned production of 3.7 million tons in 1976 as a benchmark, Booz, Allen and Hamilton (Reference 20) analyzed the actual production of the four factories. The ratio of actual-to-planned production showed a steady decline from 103.1 percent in 1970/71 to 90.1 percent in 1976. This decline is symptomatic of the managerial and technical problems that exist in the industry (20).

These problems were manifested most severely in the inadequacy of funding, in part due to military spending which resulted in problems with spare parts and led to equipment aging and obsolescence. Also, the environment attributes low priority to maintenance and quality control, leading to even lower productivity levels due to much down time and low quality clinker. Furthermore, production planning was clearly not coordinated with construction needs. Even as total production was declining, production of mixed cements (i.e. Karnak and Blast furnace slag) and special cements (sea water resistant, and white) was steadily increasing (see Table 4.8), although Portland was still the most widely used type of cement (33).

Distribution

Problems with the availability of cement are exacerbated by the distribution and delivery of the material. Only the ECO distributes cement in Egypt. It: (a) establishes the monthly production volumes and product mix for all factories; (b) handles import/export of cement

TABLE 4.8

Local Production by Type of Cement
(Million Tons)

Source: Reference (33)

| Type of Cement | Year | | | | | | | | |
|--------------------|---------|----------|---------|---------|---------|---------|------|---------|--|
| | 1970/71 | 1971/72 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | |
| Ordinary Portland | 2178942 | 2895850 | 1741549 | 1599620 | 1801010 | 1530713 | N.A. | N.A. | |
| Rapid Hardening | 463653 | 756754 | 368285 | 320389 | 334836 | 257836 | " | " | |
| Sea Water | 54170 | 97284 | 75481 | 105157 | 136905 | 121761 | " | " | |
| Blast-Furnace Slag | 749928 | 1095752 | 676895 | 611146 | 809162 | 840740 | " | " | |
| Karnak(Sand-Mixed) | 322562 | 580975 | 717693 | 576104 | 435369 | 538161 | " | " | |
| White | 43147 | 61206 | 38481 | 47228 | 59445 | 74437 | " | " | |
| Total | 3812402 | 5487821* | 3618384 | 3259644 | 3576834 | 3363648 | N.A. | 2951000 | |

*Production of 18 months.

as warranted; (c) transports cement locally; and (d) administers the quotas for local cement allocations established by the MOH. The MOH issues a monthly list allocating quotas and deliveries among: (1) Government projects and public sector enterprises; (2) private housing; (3) cement-based product manufacturers, and (4) cement retailers. While private housing quotas are limited to 10 tons per LE 1000 of construction value, a ratio established by the MOH in 1972, and restrictions exist on the cement grades available to the private sector, public sector buyers are usually provided with the quantities and grades of cement requested.

Delivery of cement is usually by truck. In 1975, 88 percent of cement was transported by trucks, 35 percent of which was in ECO owned trucks and the rest in private trucking companies under ECO contract. Only 11 percent was shipped by Nile boats, and less than one percent used railways. This may be due to the small size and dispersion of the construction sites; however, due to the higher costs of road transport it would be advisable to limit this mode to Greater Cairo and Alexandria. Greater use of the rail and water transport should be encouraged for medium- and long-hauls, especially since all three of the factories and most the population are located in the Nile Valley.

About 97 percent of Egyptian cement is transported in 50 kg bags, mainly because of a lack of required infrastructure to handle bulk cement, such as storage silos and a ready-mixed concrete industry. Such a situation leads to higher transportation/handling costs as well as to increased losses of cement due to bag breakage. Recently ECO has encouraged its customers to install silos and is itself using a small

fleet of container trucks to deliver cheaper cements. Alternative bagging techniques should also be investigated (e.g. plastic instead of paper).

The price of cement in Egypt is also regulated. The price of locally produced cement has been kept artificially low compared to imports. In 1979 for example the official price was about LE 28 per ton while imported cement cost LE 80. Such a wide differential encouraged a black market in cement. Contractors and owners who could not wait for six to eight months to receive their quota at the official price, had to utilize this market, where they could satisfy their requirements, but at a much higher price. When they finally received their quota, they, in turn, sold it in the black market. Over the period from 1970 to 1979 official prices rose only LE 8 per ton to 28, while black market prices soared from LE 10 to LE 80 per ton (33).

In addition to controlling prices, the government subsidizes trade. Originally producers received a subsidy of LE 1 for each ton exported. In 1969 this subsidy was passed on to the local consumer, as it was incorporated into the official price of local cement. Today exports are held to a bare minimum and their prices are more in line with local official prices (33). In contrast, import prices have been consistently higher than the local ones, a situation made even worse by the duties that are levied on cement imports. The government imposed an import duty subsidy on locally produced cement to narrow the gap in the prices, which in 1979 was LE 52 per ton (LE 80 imported and LE 28 local).

Restrictions on foreign exchange and the cement trade made importing more difficult. The foreign exchange problem has macroeconomic causes; regulations on cement imports have been in a constant state of flux. Until 1977, imports were restricted only to government companies. Even after the liberalization of imports in 1977 which allowed the private sector to import cement for tourism, luxury housing and office buildings, a controversial decision in 1979 temporarily barred all cement imports to Egypt causing shortages and higher prices (14).

Today the government equates the official and import prices of cement and is considering deregulating the trade. However, other factors in the Egyptian economy may yet lead to import interruptions, such as the 1982 decision by the Minister of Transportation to halt all cement imports due to congestion in the cement storage facilities in Alexandria harbor (14). So while currently no shortage is being reported, sporadic shortage in the near future can still occur until cement production capacity has increased and import regulation has stabilized.

Expected Future Supply

Plans for expansion and kiln modification in existing factories were drawn up and some began in the late 1970's. Two new factories were also underway, the Suez and El-Kattamiah factories, both incorporated under Law 43 in 1974 as private sector companies. The capacity of all three plants together with their planned dates of production are shown in Table 4.9, but as of the middle of 1981, already the one million ton new Suez factory was 30 months behind schedule; the

TABLE 4.9

Planned Local Cement Production per Factory
(Million Tons)

Source: Reference (22)

| Year of Production Producing Company | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | Total Plant 1981-85 |
|-----------------------------------------------|-------|-------|-------|-------|-------|-------|-------|---------------------------|
| Exis. (1) | 1.150 | 1.200 | 1.180 | 1.150 | 1.150 | 1.150 | 1.150 | 5.780 |
| F.E.1 (2) | | 0.300 | 0.500 | 0.700 | 0.700 | 1.500 | 1.500 | 4.900 |
| F.E.2 (3) | | | | 0.300 | 0.700 | 1.500 | 1.500 | 4.000 |
| Total | 1.150 | 1.500 | 1.680 | 2.150 | 2.550 | 4.150 | 4.150 | 14.68 |
| Exis. | 1.100 | 1.100 | 0.840 | 0.480 | 0.170 | 0.170 | 0.170 | 1.830 |
| F.E.1 | | | 0.650 | 1.200 | 1.350 | 1.500 | 1.500 | 6.200 |
| F.E.2 | | | 0.350 | 0.900 | 1.200 | 1.350 | 1.500 | 5.300 |
| Assyout | | | | 0.350 | 0.900 | 1.200 | 1.500 | 3.950 |
| Total | 1.100 | 1.100 | 1.840 | 2.930 | 3.620 | 4.220 | 4.670 | 17.28 |
| Exis. | 0.530 | 0.530 | 0.350 | 0.330 | 0.330 | 0.330 | 0.330 | 1.670 |
| F.E.1 | 0.170 | 0.600 | 0.680 | 0.850 | 0.850 | 0.850 | 0.850 | 4.080 |
| F.E.2 | | | | 0.650 | 1.000 | 1.500 | 1.500 | 4.650 |
| Total | 0.700 | 1.130 | 1.030 | 1.830 | 2.180 | 2.680 | 2.680 | 10.40 |
| Exis. | 0.410 | 0.470 | 0.500 | 0.500 | 0.500 | 0.500 | 0.500 | 2.500 |
| F.E.1 | 0.240 | 0.300 | 0.300 | 0.300 | 0.300 | 0.300 | 0.300 | 1.500 |
| F.E.2 | | | 0.300 | 0.700 | 1.000 | 1.000 | 1.000 | 3.000 |
| Total | 0.650 | 0.700 | 0.800 | 1.100 | 1.500 | 1.800 | 1.800 | 7.000 |
| Suez Er.(4) | | | 0.600 | 0.800 | 1.000 | 1.000 | 1.000 | 4.400 |
| Katt- Er. amiah | | | | 0.200 | 0.800 | 1.300 | 1.300 | 3.600 |
| Total | - | - | 0.600 | 1.000 | 1.800 | 2.300 | 2.300 | 8.000 |
| GRAND TOTAL | 3.600 | 4.500 | 5.950 | 9.010 | 11.65 | 15.15 | 15.60 | 57.36 |

- (1) Current installed capacity.
(2) Future extension 1.
(3) Future extension 2.
(4) Under erection or under tendering.

70,000 ton second extension at Torrah was delayed by 12 months; Helwan Company's Assuit factory with 1.5 million tons was 18 months behind, and the 850,000 ton expansion of the National Company was 15 months behind schedule (22). This meant that the reversal in the cement import/export situation that the Government had hoped to achieve in 1982/1983 in its 1979 National Housing Study, Reference (34), would not be reached before 1984 or 1985 at the earliest.

4.2.1.2 Reinforcing Steel

The steel consumed and produced in Egypt is in the form of reinforcing steel (rebars), steel sections and steel sheets. Rebars are the main steel component used in most structures, and as such are accorded special attention in this report. While the overall output of metallurgical products has been steadily increasing since the 1960's in Egypt, rebar output stagnated and even declined slightly in the 1970's. Rebars constituted 54 percent of the 468,000 tons of metallurgical products produced in 1970/71, but by 1975 they represented only 36 percent of the 602,000 tons of total output (56). Egypt's domestic production of rebars was never sufficient to cover all its needs. This latest decline in output in all likelihood has worsened the problem.

Production

Rebar production in Egypt has been dominated by the public sector. Four companies (National Company for Metallic Industries, Egyptian Copper Company, Delta Steel Company and Iron and Steel Company) were responsible for 92 percent of the total production of rebars in 1973, while the remaining 8 percent was produced by 17 private firms as

shown in Table 4.10. Private sector production has been generally inferior to that of the public sector and does not comply with standard specifications.

The three most important rebar producers were established during 1948-1949 to utilize the abundant iron scrap abandoned in Egypt during the Second World War. The fourth plant was started in 1958. It is the largest plant in Egypt and was the first integrated plant utilizing ore from Aswan. The plant is the sole producer of steel plates and only a fraction of its capacity is devoted to rebars.

The historical development of the production and trade of rebars is well summarized in Table 4.11. Overall, production has risen since 1960. It has, however, been interrupted by several slumps -- in 1965, 1970, 1973 and again in 1979. The 1965 slump was accompanied by decreased imports, while the others were accompanied by significant increases in imports, suggesting that while the problems in the 1960's may have been due to demand decreases, this was not so in the seventies. Furthermore, while the 1973 decline may be attributed to the War, others reflect equipment, spare parts and management problems.

The capacity utilization record of public sector firms has been mixed. Three were operating below capacity in 1973. This year was not atypical, but seems to accurately reflect the industry's problems. With the depletion of local scrap, the scrap-based production plants became dependent on imported scrap, and thus subject to foreign exchange availability. The Iron and Steel Company's very low utilization, however, is attributable to production problems. The extra cost incurred in transporting ore 900 kms from Aswan increases production

TABLE 4.10

Production Capacities and Actual Production
of Reinforcing Steel Bars by Company in 1973

Source: Reference (56)

| Company | Capacity of Reinforcing Steel Bars (metric tons) | Production in 1973 (metric tons) | Production Capacity (percent) |
|------------------------------------------------------------|--------------------------------------------------------|----------------------------------------|-------------------------------------|
| <u>Public Sector</u> | | | |
| National Company for Metallic Industries at Abou Zaabel | 85,000 | 101,292 | 119.2 ^(a) |
| Egyptian Copper Company | 70,000 | 65,084 | 93.0 |
| Delta Steel Company | 60,000 | 46,788 | 78.0 |
| Iron and Steel Company | 40,000 | 24,868 | 62.2 |
| <u>Private Sector</u> | (b) | 21,000 | — |
| TOTAL | | 259,032 ^(c) | |

(a) This may be due to use of more than one shift or by allowing for a lesser quality product.

(b) According to the Ministry of Industry, the total production capacity of steel rebars and other steel products by 17 factories of the private sector is 43,800 tons based on one shift. Product capacity of steel bars alone is not given, and it is not constant.

(c) Includes rejected production which amounts to about 5%.

TABLE 4.11

Figures on Production, Trade and Consumption of Reinforcing Steel Bars
Felt to be Representative of the Egyptian Situation
and Derived from a Variety of Sources

(Units are 10^3 Metric Tons)

Source: Reference (56)

| Year | Averaged (1) Production | Averaged (1) Imports | Averaged (2) Exports | Calculated Consumption | Averaged (3) Consumption |
|------|----------------------------|-------------------------|-------------------------|---------------------------|-----------------------------|
| 1960 | 160 | 58 | 2 | 216 | |
| 1961 | 176 | 44 | 18 | 202 | |
| 1962 | 189 | 60 | 6 | 243 | |
| 1963 | 197 | 98 | 1 | 295 | |
| 1964 | 187 | 84 | 1 | 271 | |
| 1965 | 162 | 73 | 1 | 234 | 197 |
| 1966 | 176 | 86 | 1 | 261 | 213 |
| 1967 | 176 | 74 | 1 | 250 | 254 |
| 1968 | 207 | 39 | - | 246 | 255 |
| 1969 | 214 | 30 | - | 244 | 267 |
| 1970 | 177 | 73 | - | 250 | 285 |
| 1971 | 204 | 78 | - | 282 | 314 |
| 1972 | 225 | 131 | 1 | 355 | 348 |
| 1973 | 222 | 70 | - | 292 | 319 |
| 1974 | 237 | 135 | - | 372 | 254 |
| 1975 | 199 | 269 | - | 372 | 354 |
| | 199 | 462 | - | 661 | 410 |
| 1976 | 217 | 266 | - | 483 | 454 |
| | 217 | 195 | - | 412 | 454 |
| 1977 | 225 | | | | |
| | 269 | N.A. | N.A. | N.A. | 472 |
| 1978 | 245 | N.A. | N.A. | N.A. | 408 |
| 1979 | 210 | N.A. | N.A. | N.A. | 428 |

Note: For each column labeled "averaged" the data from the appropriate sources was adjusted to a calendar-year basis if necessary (by averaging the surrounding fiscal years, e.g., data for 1969/70 and 1970/71 was averaged to obtain the representative set of calendar-year figures given in the table). Some wide differences occurred in 1975 and 1976 in the import data. In this case data was handled as two distinct sets, a high and a low set, each being presented in the table.

In the column of exports the word "averaged" was used for consistency since export figures are based on a single set of data.

The column labeled "calculated consumption" is simply averaged production plus averaged imports minus averaged exports, under the assumption that change in inventories has been negligible.

Source: Reference (56) Original sources given below:

For (1) Central Agency for Public Mobilization & Statistics, Delta Steel Company, General Organization for Industrialization, Federation of Egyptian Industries, Ministry of Planning, Steel Sales and Distribution Office, General Organization of Housing, Building and Planning Research.

For (2) Ministry of Planning.

For (3) Same as (1) plus Ministry of Housing and Reconstruction.

costs, and its low quality necessitates the use of large quantities of imported coke. The quality and quantity of the labor used in the factory is another problem. As government policy, the factory employs large numbers of poorly trained workers, even at a time of decreased output. Finally, the plant also exhibits some problems in design with respect to the economic size of their components and the adequacy of the technology of production itself. Although the blast furnaces will satisfy market demand when installed, they not large enough to realize economies of scale (20). The factory is also already obsolete because it did not use automation to compensate for the use of unskilled workers and because it did not incorporate processing innovations such as oxygen converters and continuous casting.

Shortage in different diameters plague the Egyptian construction industry from time to time. Two types of rebars are produced in Egypt: Steel 37 and Steel 52; the production of Steel 37 is much larger, representing between 68 and 74 percent of all diameters. Because production of smaller diameters reduces the capacity of the plants, small diameters are rarely produced. Actually no Steel 52 with less than 13 mm diameter, and no Steel 37 with less than 6 mm are produced. Furthermore, most of the 8 and 10 mm Steel 37 are produced by private sector firms and are usually priced higher than official steel. Finally, because plants usually produce one diameter at a time for a certain period (to increase their productivity), some of the diameters are temporarily in short supply--a situation that is complicated by the fact that imported diameters do not adequately complement the local supply. The result is shortages which lead to waste due to the use of larger than necessary diameters.

Distribution

As was the case with cement, the government controls the price, distribution and trade of steel rebars. Needs are assessed by the MOH and MOP, which in turn determine the amount to be imported. Both imported and locally produced steel are distributed through the stores of the producing and trading companies under the instructions of a steel sales and distribution office. Allocation is often insufficient.

Delivery of rebars to various sites is accomplished mainly by truck; about 63 percent of steel rebars are distributed by private trucks. In 1973 only 6 percent was transported by railways, and no use of the Nile is made whatsoever. Transportation costs charged the consumer in the mid 1970's ranged from 1.50 to 5.00 LE/ton.

Prices and costs of production of steel rose steeply in the mid-seventies (Figure 4.1). The official price to the consumer seems to be based on a "basic" price which increases in discontinuous steps. In order to arrive at the official price one has to add to this basic price one-half of a percent production support fee, one-half of a percent distribution commission; and, starting February 1, 1972, 5.0 LE/ton for the Treasury. Moreover, one has to add size raises ranging from 25 LE/ton for 6 mm bars to zero for bars larger than 16 mm, and possibly also add length raises. The latter are calculated as follows: for bars of lengths greater than 12 m and less than 15 m, one LE/ton is added to the final price. For more than 15 m long bars, 2 LE/ton is added. The production cost of rebars significantly increased in the mid-1970's and the official price of rebars is reportedly not high

enough to grant producing companies the required return on investment.

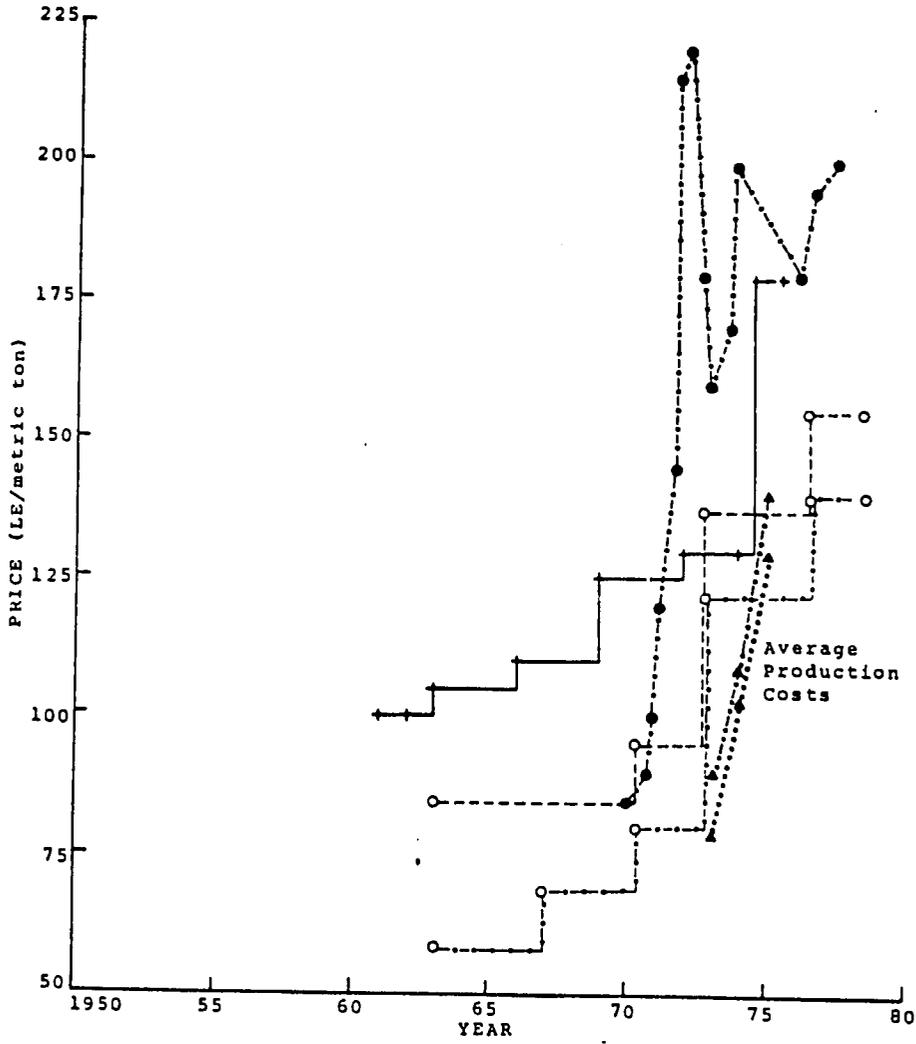
Together with the official price of rebars, the unofficial black market price for rebars also appears in Figure 4.1. The latter price significantly surpassed the official prices only in the 1970's and oscillated widely, presumably in response to local shortages. The discrepancy between official and unofficial prices was at its highest in 1971 when black market prices were 80 percent higher than official prices. In the mid-1970's as more steel was imported to meet local demand, unofficial and official prices converged. In 1977, the black market for steel rebars was about 20 percent higher than official rates at a time where waiting lines for some rebar diameters were of the order of one month. The above data suggest that rebar shortages and distribution problems are not nearly as severe as similar problems with cement where market prices are 300 percent the official prices and waiting lines are on the order of three to six months.

Transportation costs must be added to the price of steel. Among the steel producers, Delta has storage facilities in Sabtia and plays a special role as distributor of rebars. This company charges the consumer a transportation fee of 5.0 LE/ton, 3.5 LE/ton higher than the actual transportation cost to Delta.

Until 1977, only public sector companies were permitted to import steel rebars (55). The Ministries of Housing and Industry set the quantities and specifications. Imported diameters often did not complement locally produced ones, which compounded the shortages in specific diameters. Furthermore, charges were imposed on imported steel to protect locally produced steel: 10 percent for development support

FIGURE 4.1
LIST PRICES AND COSTS OF STEEL REBARS

SOURCE: Reference (56)



- +—+ Official Prices, MOH
- Basic Price Steel 37, Steel Sales Office
- Basic Price Steel 52, Steel Sales Office
- Market Price for Steel 37, Personal Contacts
- ▲.....▲ Average Production Costs of Steel 37, MOP
- ▲.....▲ Average Production Costs of Steel 52, MOP

and a 2 percent commission of foreign trade companies. Even after the private sector was allowed to import steel in 1977, shortages did not vanish completely. Foreign exchange problems and import and customs regulations will likely cause bottlenecks, and the black market will probably continue to flourish.

Future Production

New capacity for the production of rebars has been planned and included in government plans. Estimates seem to vary in the timing of the expansions (Table 4.12). Given the delays experienced by other government projects, it would seem logical to accept the most conservative estimates. Taking into consideration the fact that the formation of the company to run the Dekheila project, which is planned to produce 700,000 tons as a joint venture with the Japanese, was just initiated in the summer of 1982, it is safe to assume that production will not start in 1983 and perhaps not in 1984. In this case, average production would be between 395,000-415,000 tons in 1984.

Beyond 1985, if the project slated for Sadat City with a capacity of 400,000 tons gets underway, the situation for Egyptian rebars would be altered dramatically, as production would approach 1,500,000 tons during the 1990's. This would have a significant impact on Egypt's balance of payments and may even provide opportunities for export. This will not come about, however, until there are short term improvements in government regulations and production efficiency.

4.2.1.3 Bricks

Production

The most widely used building material in Egypt is burned

TABLE 4.12
Estimated Local Rebars Production
According to Various Sources

(values in 1000 tons)

| Year | | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|---------------------|--------------------|--------------------|-------|-------|-------|-------|-------|-------|
| National Steel | max ⁽¹⁾ | 280 | 325 | 385 | 385 | 385 | 385 | 385 |
| Delta Steel | | | | | | | | |
| Egyptian Copper | min ⁽²⁾ | 280 ⁽²⁾ | 317 | 325 | 333 | 345 | 365 | NA |
| Dekheila Project | | | | | | 143 | 580 | 770 |
| | | | | | | - | 100 | NA |
| Total Public Sector | max ⁽¹⁾ | | 325 | 385 | 385 | 628 | 965 | 1155 |
| | min ⁽²⁾ | | 317 | 325 | 333 | 345 | 465 | - |
| Private Sector | max ⁽¹⁾ | 20-40 | 30-40 | 30-40 | 30-40 | 30-40 | 30-40 | 30-40 |
| | min ⁽²⁾ | 30-50 | 30-50 | 30-50 | 30-50 | 30-50 | 30-50 | 30-50 |
| Grand Total | max ⁽¹⁾ | | 375 | 435 | 435 | 678 | 1015 | 1205 |
| | min ⁽²⁾ | | 347 | 355 | 363 | 375 | 495 | |

Sources: (1) Reference (34)
(2) Reference (22)

brick, the "red brick," made in 7x12x25 cm. standard sizes from a mixture of silt and sand. Production of red bricks accounted for about 92 percent of total brick production in 1976. The second largest group, cement bricks, accounted for only about 5 percent of brick production in the same year. The majority of cement bricks are produced in blocks larger than a red brick and are hollow. Contractors produce about 90 percent of cement bricks, usually for their own consumption on large building sites. Cellular concrete, a mixture of sand, lime, cement, and imported aluminum powder, is also produced in small quantities by the Sand Bricks Co., the sole public sector brick producer in Egypt. This company also produces sand-lime bricks which accounted for about 2 percent of the total production of bricks in 1976. Clay-facing bricks are also produced in negligible quantities by another public sector refractory firm. Finally, just recently the brick industry began exploiting the ancient shale beds, called desert clay, to manufacture "shale bricks". By the beginning of the next decade, shale brick is expected to be the main product of the industry. Table 4.13 lists various types of bricks produced by the industry together with some of their characteristics.

Wide-scale interest in brick production has been relatively recent in Egypt, beginning in earnest only when brick prices rose dramatically in the mid-1970's and attention was drawn to the serious problem of the non-renewal of silt deposits brought on by the construction of the High Dam. This relatively recent interest, together with the fact that at least 90 percent of the bricks consumed in Egypt are produced in small private sector factories scattered around the

TABLE 4.13

Description of Types of Bricks
Produced in Egypt

Source: Reference (55)

| Type of Brick | Raw Material | Standard Size (cm) | Compression Strength (kg/cm ²) |
|---------------|--------------------------|--------------------------|-----------------------------------------------|
| Red Brick | Nile Silt | 25 x 12 x 6 | 50-100 |
| Shale | Shale & Sand | | 250-400 |
| Sand Lime | Sand & Quick Lime | 25 x 12 x 6 | 250 |
| | | 25 x 12 x 13 (hollow) | |
| Lightweight | Cement & Light Aggregate | 40 x 15 x 10 (hollow) | |
| | | 40 x 20 x 20 | |
| Hajarite | Cement & Limestone | 23 x 11 x 22 | |
| Concrete | Cement & Sand | 7 X 12 X 6 | 200 solid |
| | | 25 x 12 x 12 (hollow) | 60 hollow |
| | | 40 x 20 x 20 | |

banks of the Nile River, have made it difficult to obtain reliable estimates of brick production in Egypt, as evidenced by the low and high values reported in Table 4.14. Yet, the findings of the most recent study on brick production demonstrate that despite the official encouragement of shale bricks, red brick production as of 1981 was not declining. This survey of the brick factories in every governorate of Egypt determined that the capacity for producing red brick (4,540 million bricks per year) was much higher than that estimated by all previous studies (1500 million bricks) (79).

There are several problems in brick production in Egypt. First, red brick quality is inconsistent; its production technologies vary from manual to semi-automatic. In the Beir Shams factory of the Sand Brick Co., the only public plant producing red bricks, the process is comparatively sophisticated. The plant uses an extruder/cutter to produce the brick, as opposed to placing the mixture by hand in a wooden frame, and drying takes place in a shed or roofed Hoofman kiln, while bricks are left to dry in the sun or fired in the open in a Hoffman kiln in the private sector.

Other problems exhibited in this and other factories of the Sand Brick Co. are illustrative of the general problems facing the brick industry: the most important are low plant capacity utilization; low labor productivity; inadequate water and electricity; and equipment breakdowns; all leading to loss-producing operations. The Beir Shams factory's 1976 production was 2.9 million red bricks, or 73.5 percent of plant capacity. A recent study (Reference 55) reported that production per worker is much lower than in private yards, that the plant has

TABLE 4.14

Production of Different Types of Bricks
According to Various SourcesUnits in Million bricks
of 25 x 12 x 6 cm

| Year | Averaged Red ⁽¹⁾ Brick Production | Cement ⁽³⁾ | Hajarite ⁽²⁾ | Light ⁽²⁾ Weight | Sand-Lime ⁽²⁾ Brick Production | Shale |
|------|-------------------------------------------------|-----------------------|-------------------------|--------------------------------|-------------------------------------------------|-------|
| 1961 | 730 | N.A. | | | 10 | |
| 1962 | 750 | " | | | 17 | |
| 1963 | 700 | " | | | 15 | |
| 1964 | 705 | " | | | 24 | |
| | 1030 | | | | | |
| 1965 | 702 | " | | | 12 | |
| | 1156 | | | | 21 | |
| 1966 | 600 | " | | | 13 | |
| | 1047 | | | | 27 | |
| 1967 | 624 | " | | | 16 | |
| 1968 | 608 | " | | | 14 | |
| 1969 | 708 | " | | | 21 | |
| 1970 | 763 | " | | | 19 | |
| 1971 | 767 | " | | | 19 | |
| 1972 | 772 | 81 | | - | 21 | |
| | | | | | 45 | |
| 1973 | 741 | 84 | | 7 | 31 | |
| | | | | | 50 | |
| 1974 | 535 | 84 | | 8 | 39 | |
| | 760 | | | | 46 | |
| 1975 | 600 | 84 | | 11 | 46 | |
| | 709 | | | | | |
| 1976 | 515 | 85 | | 11 | 32 | |
| | 1500 | | | | 47 | |
| 1977 | 1570 | 84 | | 12 | 38 | |
| | | | | | 72 | |
| 1978 | 1600 | 84 | 95 | 32 | 69 | |
| | | 95 | 114 | 45 | 90 | |
| 1979 | 1500 | 125 | 125 | 80 | 92 | 50 |
| | | | 132 | | | |

Note: For each column labeled "averaged" the data from the appropriate sources were adjusted to a calendar-year basis if necessary (by averaging the surrounding fiscal years, e.g., data for 1969/70 and 1970/71 was averaged to obtain data from 1970). All the data was averaged to obtain the representative set of calendar-year figures given in the table. Some wide differences occurred in the production data for 1963-66 and 1971. In each of the above cases, the data was handled as two distinct sets, a high and a low set, both of which are being presented in the table.

The column labeled "calculated production" is simply averaged red brick production plus averaged sand-brick production.

Source: Reference (55). Original sources given below:

For (1) Academy of Science and Technology, Central Agency for Public Mobilization and Statistics, Federation of Egyptian Industries, General Organization for Housing, Building and Planning Research, General Organization for Industrialization, Ministry of Industry and Mining.

For (2) Academy of Science and Technology, Central Agency for Public Mobilization and Statistics, Federation of Egyptian Industries, General Organization for Industrialization, Sand Brick Company.

For (3) Same as (1) above, and Ministry of Housing and Reconstruction.

difficulty in keeping workers because of the relatively low salaries and frequent breakdowns of equipment, and that it is not profitable. Similarly, in the Nasr City factory of the same Sand Brick Co., capacity utilization in 1976 was extremely low: 30 percent for the sand-lime brick line and 18 percent for cellular concrete; production per worker was lower than in the average private brick yard (20); and the sand-lime line was not profitable, though cellular concrete did realize some profits. In the Abbasayia factory, which produces sand-lime bricks and cement bricks, 65 percent of capacity was utilized in 1976 in the production of sand-lime bricks while only 48 percent of the production capacity was utilized during the same year in the manufacture of cement bricks. Productivity per worker in sand-lime brick production has been very low: half that of the sand-lime line in the Nasr City plant. Both the sand-lime and cement brick lines operate at a loss. Like the Nasr City factory, the Abbasayia plant is plagued by disruptions in the water supply and insufficient skill of the labor force. Additionally, this plant is hampered by the old age of its equipment: because spare parts are unavailable, down-time for maintenance is very high.

Distribution

Except for sand bricks produced by the public sector, brick pricing and trading is left to the open market. Shortages in raw material supplies and increases in labor costs of production are transferred to the consumer, i.e., the contractor and ultimately the client. There has been no indication of any substantial delays in obtaining bricks: the average delay was between one and two weeks from order to delivery, which is short in comparison to cement, for example.

There is no foreign trading in bricks. All production is consumed domestically, and there seems to be no need for inventories. The product is fragile and heavy; and because it is usually transported by truck, factories service sites at only short distances. Costs are obviously higher for projects in remote areas, either because of exorbitant transportation costs or because of use of more expensive alternatives.

Recently, red brick prices increased, mainly because brick plants had to pay for the raw materials they previously obtained free of charge. Firms must now pay for the silt they scrape off the agricultural top soil, which was once deposited during yearly floods that were stopped by the construction of the high dam. The increased demand expected in the future will sustain such practices. Prices jumped from LE 7.50 per 1000 bricks in 1970 to LE 20 per 1000 in 1977 to LE 25 per 1000 in early 1982. Shale bricks were expected to sell for LE 17-18 per 1000 in 1977; however, they are currently selling for LE 28 per 1000 in Cairo (78).

Sand lime bricks were selling for LE 17.6 per 1000 in 1977, a price set by the government and one which barely covers the production costs of the public sector firms. This price was maintained artificially low in the mid-seventies so that these bricks could compete with the cheaper red bricks. Although we do not have information on the present price of sand-lime bricks it is expected to be still in line with that of the red bricks.

Future Supply

A summary of the government plans for brick production is

shown in Table 4.15. These estimates have been calculated based on the following assumptions: (a) red brick production will not increase, rather it will be gradually modernized to utilize desert shale; and (b) shale brick production will continue to increase. In fact, the desert shale program has been slow to get underway, and as of 1980, only about 70 million bricks were being produced. Accordingly these plans seem to be overambitious, as to the plans for other bricks and blocks. For this reason, the Construction Industry Study, (Reference 22) has revised the expected output: these revised estimates are the ones shown in the table as most probable output figures.

These figures represent a downward revision of government plans. An important change would be necessary if the actual production of red bricks turns out to be 4,500 million (and not the 1500 million used here). The modernization program suggested would have to be considerably increased if effective substitution of red bricks is to be achieved. Until such efforts begin to pay off, however, production costs for red bricks will continue to increase, and so will their prices.

4.2.1.4 Calcined Gypsum

Production

Calcined gypsum is one of the major secondary materials used in construction in Egypt. Because walls are usually made from bricks, plastering is always an important part of any construction. More recently, other applications have been introduced to the Egyptian market, such as gypsum blocks, partition boards, and ceiling tiles. Because gypsum ore is plentiful in Egypt, calcined gypsum is

TABLE 5.15

Estimated Future Brick and Manufactured Block Production
(Million Bricks)

Source: Reference (34)

| Producing Company | Year of Production | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | Total Plan 1981/85 |
|----------------------|--------------------|------|------|------|------|------|------|------|--------------------|
| Red bricks: | | | | | | | | | |
| Traditional (P) | | 1087 | 750 | 437 | 175 | - | - | - | 162 |
| Modernized (P) | | 413 | 750 | 1063 | 1325 | 1500 | 1500 | 1500 | 6888 |
| Total | | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 1500 | 7500 |
| Shale Bricks: | | | | | | | | | |
| 1 | (L) | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 500 |
| 2 | (L) | | 10 | 15 | 15 | 15 | 15 | 15 | 75 |
| 3 | (L) | | | | 25 | 50 | 50 | 50 | 175 |
| 4 | (P) | | | 100 | 200 | 200 | 200 | 200 | 900 |
| 5 | (P) | | | 30 | 60 | 60 | 60 | 60 | 270 |
| 6 | (P) | | | 15 | 30 | 30 | 30 | 30 | 135 |
| 7 | (P) | | | 15 | 25 | 25 | 25 | 25 | 115 |
| 8 | (P) | | | 5 | 10 | 10 | 10 | 10 | 45 |
| Total | | 50 | 110 | 280 | 265 | 290 | 490 | 490 | 2215 |
| Most Likely | | | 70 | 140 | 465 | 490 | 490 | 490 | |

(P) private sector

(L) public sector

1 Siegart Company (Deglah)

2 Egyptian Company for Refractories (Aswan)

3 Nasr Company for Phosphates (El-Sobaiah)

4 Misr Company for Shale Bricks (Wadi El-Hay)

5 Misr-Iron Company for Shale Bricks

6 Wadi El-Natroun Company

7 Beri Suf Company

8 Wadi El-Hay Company

TABLE 4.15 (continued)

Estimated Future Brick and Manufactured Block Production
(Million Bricks)

| Producing Company | Year of Production | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | Total Plan 1981/85 |
|--------------------------|--------------------------|------|------|------|------|------|------|------|-----------------------|
| Sand-lime bricks | | | | | | | | | |
| Existing Capacity | | | | | | | | | |
| 9 (L) | | 12 | 30 | 30 | 30 | 30 | 30 | 30 | 150 |
| 10 (L) | | 45 | 60 | 60 | 60 | 60 | 60 | 60 | 300 |
| 11 (L) | | 35 | 45 | 45 | 45 | 45 | 45 | 45 | 225 |
| Under Erection | | | | | | | | | |
| 12 (L) | | | | 25 | 50 | 50 | 50 | 50 | 225 |
| Proposed Projects | | | | | | | | | |
| 13 (L) | | | 15 | 20 | 25 | 30 | 30 | 30 | 135 |
| 14 (L) | | | | | 25 | 50 | 50 | 50 | 175 |
| 15 (L) | | | | | | 25 | 50 | 50 | 125 |
| 16 (L) | | | | | | | 25 | 50 | 75 |
| Total | | 92 | 150 | 180 | 215 | 290 | 340 | 355 | 1400 |
| Most Likely | | | 135 | 160 | 210 | 260 | 310 | 335 | |
| 9 | Al-Abbasiyah Factory | | | | | | | | |
| 10 | Nasr City Factory | | | | | | | | |
| 11 | Qesna Factory | | | | | | | | |
| 12 | El-Menia Factory | | | | | | | | |
| 13 | Rasheed and Edco Factory | | | | | | | | |
| 14 | El Harram Factory | | | | | | | | |
| 15 | El-Abbasiyah Factory | | | | | | | | |
| 16 | Alexandria Factory | | | | | | | | |

TABLE 4.15 (continued)

Estimated Future Brick and Manufactured Block Production
(Million Bricks)

| Year of Production Producing Company | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|-----------------------------------------------|------|------|------|------|------|------|------|
| Light-Weight Bricks 17 (L) | 80 | 125 | 305 | 430 | 505 | 580 | 605 |
| Total | 80 | 125 | 305 | 430 | 505 | 580 | 605 |
| Most Probable | | 100 | 250 | 375 | 440 | 525 | 350 |
| Hagarite Bricks 18 | 132 | 132 | 132 | 132 | 132 | 132 | 132 |
| Total | 132 | 132 | 132 | 132 | 132 | 132 | 132 |
| Concrete Bricks 19 (L & P) | 125 | 147 | 171 | 193 | 213 | 213 | 213 |
| Total | 125 | 147 | 171 | 193 | 213 | 213 | 213 |
| Miscellaneous Bricks 20 | - | - | 410 | 410 | 410 | 410 | 410 |
| Total | - | - | 410 | 410 | 410 | 410 | 410 |
| Most Probable | - | 208 | 235 | 287 | 303 | 317 | 327 |
| GRAND TOTAL | - | - | 2987 | 3365 | 3540 | 3665 | 3705 |
| Most Likely Supply | | 2292 | 2588 | 3162 | 3338 | 3487 | 3543 |

17 Sand Brick Company (Nasr City) and Sand Brick Company (Kewesnah)

18

19 Sand Brick Companies (Abbasiah and Minya), Contractors and Private Sector.

20 From different producing origins.

manufactured locally. Modern calcining of gypsum was begun in Egypt in 1908 when the Ballah Gypsum Company was founded near Ismailia.

Today, like the case of cement and steel, all calcined gypsum production is in the hands of the public sector. The three gypsum producers are: GYMCO, Kawmia Cement Co., and Alexandria Cement Co., with GYMCO alone responsible for about 74 percent of total production. Two private producers of raw gypsum exist: one near Port Said scrapes gypsum from the bottom of Lake Mariout; the other produces south of Giza Governorate. Egyptian officials have pointed out that the quality of the gypsum produced by these two producers is well below standards; and that furthermore, the level is negligible when compared to the production of the public sector companies (78). Table 4.16 shows the production of the three producers and consumption of calcined gypsum in Egypt since 1969.

GYMCO currently produces calcined gypsum at three locations: the El Ballah factory (incorporated into GYMCO in 1969) with a capacity of 130,000 tons per year in 1982, the Allamain factory with a capacity of 60,000 tons per year, and the Gharbaniat also with a capacity of 60,000 tons per year. GYMCO uses the thermal dry process with calcining temperatures below 200 degrees Centigrade (C), usually between 160 degrees C to 190 degrees C. Until 1980, the Ballah factory had three vertical kilns while the other two factories operated three rotary kilns each. All kilns operate for 24 hours a day, using diesel fuel. The addition of one rotary kiln in Gharbariat and in Allamein in 1981 has increased their capacity by 20,000 tons a year each to reach 80,000 tons. The addition of two rotary kilns to Ballah factory has increased its capacity to 180,000 tons per year.

Before 1967, calcined gypsum was produced only at the Ballah factory near Ismailia. After the 1967 War and the loss of the Sinai, the Company dismantled part of the El Ballah factory and moved it to El Allamein, some 80 kms west of Alexandria. By 1969 it had become impossible for the company to operate in the Suez Canal Zone due to the War of Attrition and the continuous shelling across the Canal. The remaining parts of the factory were dismantled and moved, some to El Allamein and the remaining to a second location only 50 kms west of Alexandria at El Gharbaniatt, where GYNCO has quarry rights for a gypsum deposit.

Production capacity at each of those two sites was 60,000 tons of calcined gypsum per year. The kilns currently used by GYNCO are produced locally by the company's own workshop. Aside from the motors and the trucks and loaders used by the firm, the building and all other parts are locally manufactured in Egypt, which facilitates maintenance problems considerably and helps keep production costs relatively low. The local market, however, does not have the capacity to produce the more sophisticated rotary kilns needed for the firms' planned expansions. This is why the firm has contracted with West German suppliers for its two new 300,000 tons/year plants.

El Kawmia Co. produces gypsum at its cement factory south of Cairo near Helwan, which has an annual production capacity of 80,000 tons of calcined gypsum. Alexandria Cement Co. produces in Alexandria a maximum of 10,000 tons per year. Both use converted cement kilns to calcine the gypsum, and hold titles to gypsum quarries near their factories. Production by the cement companies was triggered by the

interruption of the supply from GYMCO in 1969 and 1970. At a time when foreign exchange was dear and import substitution was encouraged by the government, these companies seemed well-suited to production, as they were familiar with the technology and already used gypsum in cement production itself. Today, the two companies' combined production is much smaller than that of GYMCO.

Despite the abundance of gypsum ore throughout Egypt, access to the raw material has been an important factor in the production of gypsum. First, the Sinai deposits, the purest and thickest deposits with some 18 million tons of reserves, had been out of Egyptian hands from 1967 until 1979 when Israel controlled the Peninsula. Secondly, some of the existing deposits are being rendered unusable. For example, GYMCO's Gharbaniat Quarry has been flooded by underground water, its other quarry near Allamein will be exhausted in 3-4 years, and the Ballah Quarry, the oldest, has only three million tons of reserves. The quarry in Gerza, mined by the Kawmia Cement Company, is also running out very quickly, with only three million tons of thin layered gypsum in reserve.

Lately, however, two factors have changed the situation drastically. In 1975, a new deposit was discovered in the Western Desert, which has proven to be the largest deposit in Egypt to date with 50 million tons of confirmed reserves and 2000 million in potential reserves. The exploitation of this deposit has slowly begun but has been minimal so far due to the lack of access roads. GYMCO was given a virtual monopoly on the exploitation of this deposit, which increases its force in the gypsum market in Egypt. The other factor influencing

the availability of gypsum ore was the return of the Sinai and with it the gypsum quarries. Presently, the Sinai Company for Manganese, a public sector firm, and a private firm both hold quarrying licenses for this deposit. These factors and efforts to exploit other deposits in Fayoum and other parts of the country promise to provide opportunities for the more widespread use of gypsum products in the construction industry in Egypt.

Distribution and Trade

From Table 4.16 it can be seen that gypsum imports have not been as significant as cement and steel rebar imports. Exports have been also minimal, and by 1980 they had completely stopped. Actually, building materials and equipment suppliers in Cairo (Reference 78) reputed that efforts to import gypsum for 1981 had been underway when there was increased demand for gypsum plaster in Egypt because of extreme shortages in white cement in 1980 and 1981. The importation never took place because the bids were judged to be too expensive (the lowest price was LE 70/ton CIF Alexandria).

Because plaster is produced by public sector companies, its price is regulated by the government. In April 1982, GYMCO's price was LE 32 per ton in 50 kg bags for standard grade plaster, and LE 38/ton for super grade. This price included transportation costs from the factories west of Alexandria to construction sites in Cairo; a distance of 250 kms. Transportation is mostly performed by private trucking companies as well as GYMCO's fleet, at an average cost of LE .04 per ton km. Currently GYMCO is considering bulk transportation for plaster in 17-18 ton special trucks. GYMCO estimates that bagging costs between

TABLE 4.16

Calcined Gypsum Production and Consumption in Egypt

Source: Reference (19)

| YEAR | GYMCO | KAWMIA CO. | ALEXANDRIA CO. | TOTAL PRODUCTION | DOMESTIC CONSUMPTION | SURPLUS |
|-------|-------|-------------------|-------------------|---------------------|-------------------------|-------------------|
| 69/70 | 78 | - | - | 78 | N.A. | N.A. |
| 70/71 | 76 | 51 | - | 127 | 127 | - |
| 71/72 | 138 | 57 | - | 195 | 147 | 48 |
| 73* | 103 | 56 | 11 | 164 | 164 | - |
| 74 | 99 | 52 | 8 | 195 | 157 | 38 |
| 75 | 106 | 54 | 10 | 191 | 191 | - |
| 76 | 184 | 59 | 7 | 250 | 232 | 18 ⁽²⁾ |
| 77 | 233 | 65 | 7 | 305 | 280 | 25 ⁽²⁾ |
| 78 | 256 | 88 ⁽¹⁾ | 4 | 348 | 329 | 9 ⁽²⁾ |
| 79 | 267 | 88 ⁽¹⁾ | 7 ⁽¹⁾ | 362 | 353 | 9 ⁽²⁾ |
| 80 | 256 | 80 ⁽¹⁾ | 10 ⁽¹⁾ | 340 | 340 | - |

*Production for 18 months.

(1) Estimated figures.

(2) It was stated in the reference that these quantities were exported.

LE 2-6 per ton. They plan to sell their bulk plaster at between LE 26-30 per delivered ton through 1983 (78).

Up to 1980, when gypsum was available in large quantities, the controlled price system worked relatively smoothly and each holder of a building permit could buy the quantity he required at the controlled price. In 1981, when demand greatly exceeded supply, initially the price of gypsum in the black market skyrocketed to LE 100 per ton. By April 1982, when the situation eased a little, the price fell to LE 45 per ton (78). Until supply increases to match the increased demand such sporadic disparities between controlled and black market prices are expected to continue.

Future Supply

Plans to increase the production of plaster in Egypt are expected to be realized through both existing producers and new producers entering the market. These plans are detailed in Table 4.17. While steps toward expansion have been initiated, whether they will be completed on schedule is questionable. Contract for two new 300,000 ton GYMCO plants, one in Gharbaniat and the other in Sadat City were signed in 1982; production was scheduled to begin in 1983 and 1984, respectively. Kawmia Cement Company was suffering from raw material supply problems, and the success of future expansion depended on their resolution. Currently they are considering buying ore from Sinai quarries or even GYMCO in the Western Desert. The Osman plant is a totally new private venture; and despite the inexperience of the firm in dealing in gypsum, this may be the only project to be completed close to its scheduled start up in 1983 or 1984. The Sinai Manganese Company

TABLE 4.17

Forecasted Plaster Production

Source: Reference (19)

(values in 1000 tons)

| YEAR | GYMCO | | KAWMIA | | ALEXANDRIA | | M. OSMAN | | SINAI | | TOTAL | | GRAND TOTAL |
|------|----------|------------|----------|------------|------------|------------|----------|------------|----------|------------|----------|------------|-------------|
| | EXISTING | ADDITIONAL | EXISTING | ADDITIONAL | EXISTING | ADDITIONAL | EXISTING | ADDITIONAL | EXISTING | ADDITIONAL | EXISTING | ADDITIONAL | |
| 1982 | 250 | 110 | 80 | - | 10 | - | - | - | - | - | 340 | 110 | 450 |
| 1983 | 250 | 110 | 80 | - | 10 | - | - | 75 | - | - | 340 | 185 | 525 |
| 1984 | 250 | 335 | 80 | 225 | 10 | - | - | 102 | - | - | 340 | 662 | 1,002 |
| 1985 | 250 | 590 | 80 | 225 | 10 | - | - | 120 | - | - | 340 | 965 | 1,350 |
| 1986 | 250 | 665 | 80 | 300 | 10 | - | - | 120 | - | 110 | 340 | 1,195 | 1,535 |
| 1987 | 250 | 710 | 80 | 300 | 10 | - | - | 120 | - | 300 | 340 | 1,430 | 1,770 |
| 1988 | 250 | 710 | 80 | 300 | 10 | - | - | 120 | - | 300 | 340 | 1,430 | 1,770 |
| 1989 | 250 | 710 | 80 | 300 | 10 | - | - | 120 | - | 300 | 340 | 1,430 | 1,770 |
| 1990 | 250 | 710 | 80 | 300 | 10 | - | - | 120 | - | 300 | 340 | 1,430 | 1,770 |

(*) These dates are based on the assumption that the project would begin to be implemented in 1984.

project, expected to produce 300,000 tons in Sinai, is still on the drawing board. It may be quite some time before it actually begins production. Taking all these factors into consideration, it would be safe to assume that the most likely future supply of gypsum is that shown in the last column in the table.

4.2.2 Construction Manpower

Egyptian construction employs manpower for two distinct functions: management/administrative, and site workers. Here we shall investigate the supply of both categories, the efficiency of their operations, wages, and the potential problems in the availability of each.

4.2.2.1 Site Labor

Egyptian construction traditionally has been a labor intensive operation. Available estimates confirm that increases in construction output have been accompanied by increases in sectoral employment (Table 4.18). It is apparent that the fluctuations in employment follow the changes in the general level of investment in the economy that were described earlier. The latest surge in construction demand occurred in the mid-seventies, with employment rising sharply from 387,000 in 1970 to 537,000 in 1978.

Along with this increase in employment has been an improvement in wage levels, as shown in Table 4.19. During the sixties, this increase was relatively steady, averaging about 5 to 10 percent per year, enough to cope with the rise in the cost of living. Since 1970, this increase in wages has become rather dramatic. Across the board, wages soared by 200 to 500 percent between 1970 and 1977, with most

TABLE 4.18

Construction Employment as a Percentage of Total Employment
with Two Alternative Series of Construction Employment

Source: Reference (11)

| Year | Total Employment (A)* | Construction Employment (B) | % B/A | Construction Employment | % C/A |
|---------|-----------------------------|-----------------------------------|----------|----------------------------|----------|
| 1937 | 5,806 | 120,706 | 2.1 | 120,706 | 2.1 |
| 1947 | 6,641 | 113,361 | 1.7 | 113,361 | 1.7 |
| 1958 | 6,711 | 119,000 | 1.8 | 152,000 | 2.3 |
| 1960 | 6,006 | 185,000 | 3.1 | 155,126 | 2.6 |
| 1961 | 6,492 | 166,000 | 2.6 | | |
| 1962 | 6,657 | 263,000 | 4.0 | | |
| 1963 | 6,868 | 315,700 | 4.6 | | |
| 1964 | 7,085 | 334,200 | 4.7 | | |
| 1965 | 7,374 | 345,200 | 4.7 | | |
| 1966 | 7,480 | 318,000 | 4.3 | 203,517 | 2.7 |
| 1967 | 7,617 | 307,600 | 4.0 | | |
| 1968 | 7,893 | 258,100 | 3.3 | 191,100 | 2.4 |
| 1969 | 8,132 | 338,000 | 4.2 | 184,700 | 2.3 |
| 1970 | 8,361 | 387,900 | 4.6 | 203,200 | 2.4 |
| 1971 | 8,458 | 354,000 | 4.2 | 194,900 | 2.3 |
| 1972 | 8,672 | 359,700 | 4.1 | 206,900 | 2.4 |
| 1973 | 8,860 | 302,300 | 3.4 | 242,400 | 2.7 |
| 1974 | 9,038 | 315,200 | 3.5 | 232,900 | 2.6 |
| 1975 | 9,433 | 447,400 | 4.7 | 285,000 | 3.0 |
| 1976 | 9,628 | 434,000 | 4.5 | 293,000 | 3.0 |
| 1977 | 9,983 | 493,700 | 4.9 | | |
| 1978 | 10,349 | 537,700 | 5.1 | | |
| 1979 | 11,975 | 460,000 ^(a) | 3.8 | | |
| 1980(a) | 11,247 | 540,000 | 4.4 | | |

*In thousands

^(a) Estimated

TABLE 4.19
Average Daily Money Wage in L.E.
For Various Construction Works

Source: Reference (11)

| | 1960 ^(a) | 1962 ^(a) | 1965 ^(a) | 1970 ^(b) | 1973 ^(b) | 1975 ^(b) | 1977 ^(b) | %Change 60-70 | %Change 70-77 |
|---------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------------------|------------------|
| Masons | 0.80 | 0.80 | 0.90 | 1.50 | 2.50 | 3.50 | 5.70 | 87.5 | 280 |
| Assistant Masons | 0.60 | 0.60 | 0.70 | 1.00 | 2.00 | 3.00 | 5.70 | 67.0 | 470 |
| Low-skill Masons | 0.40 | 0.40 | 0.50 | 0.60 | 1.50 | 2.00 | 3.00 | 50.0 | 400 |
| Excavation | 0.20 | 0.20 | 0.25 | 0.30 | 0.60 | 1.00 | 1.50 | 50.0 | 480 |
| Concrete Carpenter | 0.70 | 0.70 | 0.80 | 0.90 | 1.25 | 2.00 | 3.25 | 29.0 | 260 |
| Assistant C. Carpenter | 0.40 | 0.40 | 0.50 | 0.60 | 0.80 | 1.50 | 2.25 | 50.0 | 275 |
| Steel Fixer | 0.50 | 0.50 | 0.55 | 0.70 | 1.00 | 2.00 | 3.00 | 40.0 | 329 |
| Assistant | 0.50 | 0.50 | 0.55 | 0.60 | 0.90 | 1.50 | 2.50 | 20.0 | 317 |
| Concrete Pourer | 0.40 | 0.40 | 0.50 | 0.60 | 0.90 | 2.00 | 3.00 | 50.0 | 400 |
| Plumber | 0.70 | 0.70 | 0.75 | 0.80 | 1.50 | 4.00 | 5.00 | 15.0 | 520 |
| Assistant | 0.35 | 0.35 | 0.40 | 0.50 | 0.90 | 2.00 | 2.50 | 43.0 | 400 |
| Plasterer | 0.60 | 0.60 | 0.70 | 0.75 | 0.90 | 2.00 | 3.00 | 25.0 | 300 |
| Assistant | 0.30 | 0.30 | 0.40 | 0.50 | 0.60 | 1.00 | 1.90 | 67.0 | 280 |
| Painter | 0.70 | 0.70 | 0.75 | 0.80 | 1.00 | 2.00 | 3.00 | 15.0 | 275 |
| Assistant | 0.35 | 0.35 | 0.40 | 0.50 | 0.70 | 1.25 | 1.50 | 43.0 | 200 |
| Joiner | 0.60 | 0.60 | 0.70 | 0.80 | 1.25 | 2.00 | 3.50 | 33.0 | 335 |
| Assistant | 0.35 | 0.35 | 0.40 | 0.50 | 0.80 | 1.25 | 2.00 | 43.0 | 300 |
| Electrician | 0.30 | 0.30 | 0.40 | 0.75 | 1.00 | 2.00 | 3.20 | 150.0 | 325 |
| Assistant | 0.20 | 0.20 | 0.35 | 0.50 | 0.75 | 1.50 | 1.70 | 150.0 | 240 |

(a) Values are 70% of those in Reference (10) to account for social security.

(b) Values are from Reference (29).

doubling between 1973 and 1975. This dramatic change is attributable to the emigration of construction labor to other countries, especially since 1972. The M.I.T./Cairo University team's research estimates the number of construction workers that left Egypt in 1976 alone to be between 200,000 and 250,000, which represented more than 50 percent of the construction labor force at the time (11). Moreover, a significant percentage of emigrés were highly skilled and semi-skilled workers, such as masons and electricians, which explains why the wages of some trades increased much more than others. The increase in sectoral employment was accounted for in large part by laborers new to construction. While beneficial from the standpoint of the national economy, the unemployed and underemployed who entered construction work were by and large less productive than the laborers they replaced. These new workers were unskilled, and their on-the-job training was particularly expensive.

Rising wages have placed great strains on private contractors, who are experiencing difficulties in keeping their workers. Public contractors are also under the same pressure despite the job security, benefits, social security, and health plans which public sector employment can offer to offset controlled wages. Furthermore, both sectors are being forced to employ lower quality workers. Most medium-sized firms were even forced to use their supervisory staff to perform manual labor, further reducing the efficiency of their operations (76).

The labor problems of the contractors are not all due to migration. The way labor is used and controlled poses equally important problems for the contractors. Both the public and private

sectors rely heavily on labor subcontractors to provide the required labor for their projects. Only a small part of the work is normally carried out by the general contractor's own staff. Typically, a contractor has small teams able to work on the structural parts of the building, and subcontracts the non-structural work. Labor subcontractors have access to a pool of specialized laborers, normally in local gathering places and coffee shops and they hire the workers individually or in teams on a piece-work basis. Compensation is based on the performance of quotas (Tariha in Arabic).

Table 4.20 shows an example of norms that are usually set by tradition for certain main activities in building construction. These norms usually represent a range of production, but nevertheless, reflect some difference in the type of work. For example, the norm for the glazed tile worker is set lower than the floor tile worker because more precision is involved in glazed tile fixing. The adjustment of that norm to each situation, however, is left entirely to the supervisor. The units of measurement also reflect tradition; for instance, carpenters' and reinforced steel fixers' output are measured in cubic meters of concrete, as is that of the reinforced concrete workers who pour the concrete.

These norms do not necessarily reflect the exact output of on-site workers, as it is customary for foremen to assign more than one "Tariha" to a group of workers in a single day on an overtime basis. This piecework approach to control of labor while minimizing the required supervision during working hours requires that the production norm be calculated accurately; in Egypt, however, they are not. During

TABLE 4.20

Various Labor Production in the Industry

Source: Reference (11)

| ACTIVITY | NUMBER OF WORKERS | TIME | OUTPUT |
|----------------------------|-------------------|-----------|-------------------------|
| <u>Earthwork</u> | | | |
| Excavation | | | |
| loose sand | 1 | 1 day | 1.5 cu. m. |
| ordinary sand | 1 | 1 day | 2.0 cu. m. |
| Filling/Dumping | 1 | 1 day | 4.0 cu. m. |
| <u>Reinforced Concrete</u> | | | |
| <u>Steel Work</u> | | | |
| Foreman | 1 | 1 day | |
| Shapers | 2 | 1 day | |
| Installers | 2 | 1 day | 1 ton of steel |
| Assistants | 2 | 1 day | |
| Apprentices | 2 | 1 day | |
| <u>Concrete Pouring</u> | | | |
| Trade Boss | 1 | 1 day | |
| Mixer | 1 | 1 day | |
| Layout Worker | 3 | 1 day | |
| Emptier | 3 | 1 day | |
| Assistants | 6 | 1 day | 30 cubic meters |
| Carriers | 8 | 1 day | |
| Water Sprinkler | 1 | 1 day | |
| Vibrator Worker | 1 | 1 day | |
| <u>Form Work</u> | | | |
| <u>Walls</u> | | | |
| Carpenter | 1 | 3 hrs. | |
| Assistant | 1 | 2.5 hours | 10 sq. m. |
| <u>Slabs</u> | | | |
| Carpenter | 1 | 3.5 hrs. | |
| Assistant | 1 | 3.5 hrs. | 10 sq. m. |
| <u>Beams</u> | | | |
| Carpenter | 1 | 8 hrs. | |
| Assistant | 1 | 8 hrs. | 10 sq. m. |
| <u>Columns & bases</u> | | | |
| Carpenter | 1 | 4 hrs. | |
| Assistant | 1 | 5 hrs. | 10 sq. m. |
| <u>Masonry Work</u> | | | |
| Mason | 2 | 1 day | |
| Brick Carrier | 2 | 1 day | |
| Mortar Carrier | 1 | 1/2 day | 7 cu. m. of wall brick |
| Mortar Mixer | 1 | 1 day | (25 cm.) thick or 40-50 |
| Assistant Carpenter | 1 | 1/4 day | sq.m. of wall 1/2 |
| Apprentice | 1 | 1 day | brick (12 cm.) thick. |

our observations on many building sites, it was customary for groups to finish their daily "Tariha" long before the 8 hour work day was over.

4.2.2.2 Management Personnel

The supply of management personnel, defined as professional, technical, administrative and clerical workers, has increased over the years. Yet, because these workers have also been migrating abroad in pursuit of higher wages, salaries in the private sector, fringe benefits, and, to a lesser extent, salaries in the public sector, have all risen. This section will focus on professionals, engineers and architects, because of the key role they play in managing large contracting firms and construction projects in Egypt.

Because the universities and educational institutions were turning out large numbers of new professionals, emigration did not cause contractors serious problems until recently. There are nine universities in Egypt, three in Cairo alone. At one time Egyptian law required each new graduate to work for the public sector for six years. Today this law has been changed, and only those engineers who elect to work for the public sector have to stay for six years. This has somewhat decreased the supply for public sector firms and increased that for private firms.

Table 4.21 shows how management personnel have increased in construction employment in Egypt over the years. The major change occurred between 1960 and 1966, when public sector construction firms were created. The large firms created by the nationalization and amalgamation of small private sector firms were better able to support the services and salaries of an increasing number of professionals.

TABLE 4.21

Composition of Labor Force in Some Sectors

Source: Reference (11)

| | Year | Professional & Technical | Admini- strative | Clerical | Salesmen | Craftsmen & Workers | Services Workers | Other & Not Classified | Total |
|---------------|------|--------------------------------|---------------------|----------|----------|---------------------------|---------------------|------------------------------|-------|
| Construction | 1950 | 1.70 | 4.20 | 0.10 | 0.40 | 90.80 | 1.00 | 0.40 | 100 |
| | 1966 | 2.53 | 5.72 | 5.68 | 0.58 | 79.74 | 2.38 | | 100 |
| | 1974 | 4.40 | 6.30 | 6.40 | 0.30 | 78.20 | 4.00 | 0.40 | 100 |
| Manufacturing | 1960 | 1.24 | 1.22 | 3.93 | 0.73 | 90.53 | 1.78 | 0.55 | 100 |
| | 1966 | 2.21 | 2.40 | 8.08 | 1.58 | 82.03 | 1.78 | 1.78 | 100 |
| | 1974 | 3.57 | 0.64 | 6.00 | 0.85 | 84.07 | 4.83 | 0.83 | 100 |
| Agriculture | 1960 | 0.07 | 0.01 | 0.19 | 0.04 | 0.39 | 0.46 | 98.84 | 100 |
| | 1966 | 0.56 | 0.16 | 0.88 | 0.14 | 1.77 | 0.60 | 95.90 | 100 |
| | 1974 | 9.38 | 0.07 | 0.72 | 0.03 | 0.87 | 0.61 | 97.33 | 100 |

Estimates of all professionals leaving the construction industry are not readily available, but the number of engineers known to have emigrated from Egypt between 1968 and 1973 increased from about 7000 in 1968 to 19,500 in 1972 and to 18,000 in 1973 (11). Since construction employs about 2 percent of the professionals in the economy, the magnitude of those leaving construction can be estimated at between 200 and 500 per year; this accounts for about 4 percent of all construction professionals.

There are no readily available measures to test the efficiency of the managers used by Egyptian contractors; the lack of formal construction management training is, however, evident. While there is no doubt about the technical qualifications of the professionals, the lack of any institutional or professional education in construction management and operations makes them rely entirely on common practice in planning and controlling projects. The problems of quality of management personnel and their effectiveness is further demonstrated by comparing the performance of both public and private contractors (Table 4.22). Productivity per LE of wages is higher in the private sector. Since the private sector uses fewer supervisors than the public sector, the difference becomes more pronounced. This clearly indicates the need for improvement in the use of supervisory staff in public sector firms, and supports the view that public sector firms are overstaffed.

Wages in private sector firms are higher than those in the public sector. For example, in 1980 a starting salary of LE 150 per month for a new graduate is common in the private sector, while

TABLE 4.22

Share of Each L.E. Paid in Wages
in Both Public and Private Sector Contractor Output

Source: Reference (7, 8)

| Contractor's Sector Fiscal Year | General Building Contractor | | | | General Non-Building Contractor | | | |
|---------------------------------------|-----------------------------|---------|---------|---------|---------------------------------|---------|---------|---------|
| | Private | | Public | | Private | | Public | |
| | 1970/71 | 1971/72 | 1970/71 | 1971/72 | 1970/71 | 1971/71 | 1970/71 | 1971/72 |
| Value of work executed ^(a) | 19,497 | 19,061 | 40,525 | 65,841 | 9,634 | 10,667 | 14,813 | 13,130 |
| Wages paid | 4,190 | 4,049 | 15,557 | 17,398 | 3,513 | 4,220 | 3,630 | 5,739 |
| Productivity of L.E. of Wages | 4.65 | 4.71 | 2.61 | 3.78 | 2.74 | 2.53 | 4.08 | 2.29 |

(a) Public sector figures do not include work subcontracted to other firms. This work is usually supervised by the main contractors supervisory personnel.

the public sector salary for similar qualifications may be as low as half that figure. Fringe benefits in the public sector may include transportation, site incentives and overtime pay. The major attraction of the public sector, however, is its guaranteed position. With the exception of very few offenses, a public sector employee is usually guaranteed his position by law, and the firm cannot fire him. This is why some professionals and administrators refuse to quit the public sector (11).

With increasing demands on construction in Egypt, it is necessary to improve the quality and efficiency of managers and professionals in order to control satisfactorily construction operations. An important avenue to achieve such objectives lies in the continued encouragement of private sector contractors and the attraction of foreign firms to form joint ventures with Egyptian contractors. Such steps are not only necessary to increase the attractiveness of wages and salaries in Egypt and to discourage emigration, but also to provide opportunities for Egyptian managers to learn and practice new improved management techniques in Egypt.

4.2.2.3 Manpower Training

Traditionally in Egypt, training for construction trades has always consisted of on-the-job training of young apprentices. When labor was abundant, this system adequately responded to demand. The present situation, however, pressured the government to intervene in the training of workers of different trades. Government plans called for the training of some 500,000 workers per year in 62 centers between 1976 and 1980, plus three centers to train 600 instructors. As of 1979,

however, the success of the training program was limited (Table 4.23). Only 16 centers were operating, and these only at about 50 percent of capacity (22). The main obstacle seemed to be the shortage of instructors: it was estimated that only 250 instructors were working on this program, largely because of insufficient wages.

Other problems exist with the training program. For instance, the program is currently focused exclusively on the training of semi-skilled workers, despite the extreme 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 or client representatives on issues of control and supervision. Finally, the program should combine on-the-job with formal training, both to shorten the duration of the training and to provide first-hand experience to the trainee.

It is clear, given the magnitude of migration and existing employment levels, that the current training effort is inadequate. Efforts to improve this situation are desperately needed, especially since demand for labor will continue to be high. Fortunately, indicators suggest that Egypt may be past the peak of emigration. Arab demand for construction workers is slackening, workers from other parts of the world are competing with the Egyptians, and real wages in Egypt have increased. If this stabilization materializes, training efforts succeed, and demand continues for construction in Egypt, then labor cost increases may be less severe in the future than they have been in the past.

TABLE 4.23

Training by Training Organization of Ministry of Housing

Source: Reference (22)

| Year | Centers | Schools | Companies | Total | Instructors |
|-------|---------|---------|-----------|--------|-------------|
| 1975 | 1,106 | 3,267 | 130 | 4,503 | - |
| 1976 | 2,239 | 5,561 | 495 | 8,295 | - |
| 1977 | 3,243 | 4,801 | 598 | 8,642 | - |
| 1978 | 3,930 | 5,073 | 649 | 9,652 | - |
| 1979 | 4,080 | 4,124 | 340 | 8,544 | 170 |
| Total | 14,598 | 22,826 | 2,212 | 39,636 | 170 |

4.2.3 Construction Equipment

4.2.3.1 Supply

Until the mid-1970's, Egyptian contractors relied heavily on construction labor. Because labor was abundant and practically all equipment imported from abroad, equipment use was limited to special cases or large projects, such as pile driving for foundation work of a large building or land leveling for large government land reclamation projects. In 1961, the government limited import/export activity to public sector firms; since that time, they have been the sole source of equipment supply in Egypt.

The best estimate of contractor-owned and operated equipment in Egypt was made by the construction industry study, which interviewed all construction equipment purchasers and consulted the 1978/1979 census of imported equipment. In 1979, they concluded that about 30,000 units existed in Egypt (22).

The breakdown of these units together with their value is given in Table 4.24. The table also shows the age/obsolescence of the fleet by including the year of purchase of the equipment. After 1976 the fleet expanded considerably. Only about 19 percent of the fleet was one year old, and approximately 34 percent was 4 years old, which confirms that most of the equipment owned by contractors is not very new and highlights the irregular and interrupted nature of the equipment supply before 1975. Prior to that time, new equipment was purchased not as needed to replace the old, but rather when foreign exchange was available. Often the allocation of foreign exchange did not coincide with the contractor's needs. Moreover the sources and even

TABLE 4.24
The Egyptian Equipment Fleet in 1979

Source: Reference (22)

| TYPE OF EQUIPMENT | 1979 | Fleet Size | | | | | | | | | | | 1979 | 1979 | 1979 | 1979 |
|----------------------------|-------------|------------|------|------|------|------|------|-----------|-----------|-----------|-----------|------------|----------------------|-----------|--------------------------|---------------------------|
| | Group Total | 1979 | 1978 | 1977 | 1976 | 1975 | 1974 | 1970/1974 | 1965/1969 | 1960/1965 | 1950/1960 | 1950/1950+ | Unit Price 1000 LE's | Fleet No. | Fleet Value Million LE's | Group Values Million LE's |
| Crawler Bulldozers | 1761 | 210 | 315 | 310 | 614 | 164 | 54 | 52 | 28 | 14 | - | - | 85 | 1761 | 149.1 | |
| Crawler Loaders | 126 | 13 | 20 | 16 | 28 | 12 | 4 | 12 | 10 | 11 | - | - | 75 | 123 | 9.2 | |
| Wheeled Loaders | 1387 | 261 | 158 | 316 | 376 | 156 | 41 | 49 | 14 | 16 | - | - | 75 | 1387 | 104.0 | 365.5 |
| Motor Scrapers | 194 | 26 | 43 | 53 | 42 | 3 | 10 | 6 | 10 | 2 | - | - | 230 | 194 | 44.6 | |
| Motor Graders | 584 | 99 | 48 | 116 | 153 | 18 | 46 | 80 | 22 | 12 | - | - | 70 | 584 | 40.9 | |
| Dump Trucks | 4432 | 380 | 61 | 33 | 68 | 116 | 52 | 17 | 21 | 10 | 2 | - | 45 | 380 | 17.1 | |
| Mechanical Excavators | 954 | 60 | 141 | 105 | 210 | 30 | 10 | 50 | 110 | 109 | 127 | 2 | 90 | 954 | 85.9 | |
| Hydraulic Excavators | 538 | 112 | 228 | 110 | 88 | - | - | - | - | - | - | - | 60 | 538 | 32.3 | 138.2 |
| Loader Diggers | 112 | 52 | 38 | 12 | 10 | - | - | - | - | - | - | - | 35 | 112 | 3.9 | |
| Dredging M/cs & Specials | 1674 | 70 | - | 3 | - | 23 | - | 24 | - | 4 | 4 | - | 12 | 230 | 70 | 16.1 |
| Piling Hammers Air & Steam | 63 | 6 | 4 | 1 | 6 | 6 | 2 | 8 | 14 | 12 | 6 | 10 | 20 | 63 | 1.3 | |
| Piling Hammers Diesel | 26 | 8 | 4 | 10 | 3 | 1 | - | - | - | - | - | - | 36 | 26 | .9 | 2.7 |
| Piling Rigs | 175 | 86 | 6 | - | 10 | 4 | 3 | 13 | 8 | 26 | 16 | - | 6 | 86 | .5 | |
| Batching Plants | 123 | 55 | 15 | 27 | 20 | 6 | - | - | - | - | - | - | 75 | 123 | 9.2 | |
| Concrete Mixers | 4386 | 1536 | 1180 | 910 | 480 | 160 | 100 | - | - | - | - | - | 10 | 4186 | 41.9 | |
| Concrete Pumps | 140 | 28 | 28 | 35 | 37 | 12 | - | - | - | - | - | - | 160 | 140 | 22.4 | |
| Transit Mixers | 353 | 68 | 39 | 86 | 130 | 30 | - | - | - | - | - | - | 80 | 353 | 28.2 | 132.8 |
| Concreting Dumpers | 1384 | 380 | 210 | 300 | 214 | 280 | - | - | - | - | - | - | 7 | 1384 | 9.7 | |
| Tractors | 1102 | 221 | 115 | 216 | 310 | 110 | 30 | 100 | - | - | - | - | 15 | 1102 | 16.5 | |
| Trailers | 8847 | 1459 | 296 | 169 | 324 | 380 | 80 | 20 | 200 | - | - | - | 2 | 1439 | 2.9 | |
| Tower Cranes | 238 | 79 | 67 | 42 | 48 | 2 | - | - | - | - | - | - | 100 | 238 | 23.8 | |
| Crawler Cranes | 113 | 25 | 57 | 13 | 10 | 2 | - | - | 4 | 2 | - | - | 85 | 113 | 9.4 | |
| Truck Lattice Cranes | 123 | 39 | 38 | 36 | 8 | 2 | - | - | - | - | - | - | 140 | 123 | 17.2 | 78.1 |
| RT Cranes | 308 | 72 | 62 | 65 | 85 | 10 | 3 | 3 | 6 | 2 | - | - | 85 | 108 | 26.2 | |
| Material Hoists | 71 | 16 | 10 | 18 | 21 | 6 | - | - | - | - | - | - | 7 | 71 | .5 | |
| Buildere Hoists | 972 | 119 | 28 | 24 | 29 | 36 | 2 | - | - | - | - | - | 7 | 119 | .8 | |
| Asphalt Plants | 26 | 4 | 2 | 5 | 9 | 2 | 1 | - | 1 | 2 | - | - | 192 | 26 | 5.0 | |
| Pavers | 132 | 19 | 28 | 30 | 31 | 6 | 10 | 2 | 6 | - | - | - | 60 | 112 | 7.9 | |
| Bitm. Boilers & Sprayers | 22 | 4 | 2 | 6 | 6 | 4 | - | - | - | - | - | - | 25 | 22 | .6 | |
| Large Rollers | 486 | 86 | 128 | 53 | 158 | 15 | 6 | 14 | 16 | 10 | - | - | 43 | 486 | 21.9 | |
| Small Rollers | 870 | 121 | 253 | 132 | 237 | 107 | 20 | - | - | - | - | - | 8 | 870 | 7.0 | |
| Crushing Plant | 1647 | 111 | 17 | 43 | 10 | 12 | 6 | 3 | 13 | 4 | 3 | - | 250 | 111 | 27.8 | |
| Surface Pumps | 2597 | 380 | 250 | 230 | 212 | 210 | 190 | 910 | 168 | 47 | - | - | 1 | 2597 | 2.6 | |
| Submersible Pumps | 831 | 163 | 114 | 167 | 164 | 58 | 30 | 120 | 10 | - | - | - | 2.5 | 831 | 2.1 | 8.7 |
| Well Point Pmt. | 12 | - | 4 | 3 | 5 | 0 | - | - | - | - | - | - | 80 | 12 | 1.0 | |
| Special Pumps | 4440 | 1000 | 200 | 110 | 120 | 130 | 110 | 113 | 217 | - | - | - | 3 | 1000 | 3.0 | |
| Portable Compressors 27 | 946 | 275 | 161 | 172 | 134 | 30 | 21 | 92 | 21 | 40 | - | - | 30 | 946 | 28.4 | |
| Compressor 4+ | 107 | 16 | 8 | 23 | 32 | 26 | 2 | 1 | - | - | - | - | 45 | 107 | 4.8 | 34.9 |
| Rock Drills | 1138 | 85 | 10 | 11 | 21 | 18 | 2 | 5 | 1 | 1 | - | - | 20 | 85 | 1.7 | |
| Site Trucks | 2685 | 830 | 720 | 440 | 580 | 101 | 14 | - | - | - | - | - | 40 | 2685 | 107.4 | |
| Artic Trucks | 521 | 114 | 68 | 123 | 187 | 22 | 7 | - | - | - | - | - | 46 | 521 | 24.0 | 136.8 |
| Service Trucks | 63 | 16 | 10 | 21 | 10 | 6 | - | - | - | - | - | - | 7 | 63 | .4 | |
| Mobile Workshops | 3353 | 84 | 32 | 28 | 17 | 4 | 3 | - | - | - | - | 60 | 84 | 5.0 | | |
| Barges | 14 | - | - | - | 2 | - | 3 | 2 | 6 | 1 | - | - | 40 | 14 | .6 | |
| Tugs | 47 | - | 1 | - | 1 | - | 1 | 1 | 4 | 11 | 14 | 14 | 200 | 47 | 9.4 | 21.6 |
| Towboats | 60 | 2 | 8 | 13 | 10 | 5 | 2 | 10 | 10 | - | - | - | 160 | 60 | 9.6 | |
| Floating Cranes | 123 | 4 | - | - | 1 | - | - | 1 | 1 | - | - | 500 | 4 | 2.0 | | |
| Generators | 1100 | 180 | 230 | 192 | 238 | 84 | 6 | 120 | 5 | 45 | - | - | 20 | 1100 | 22.0 | |
| Welding Plant | 1109 | 471 | 134 | 162 | 117 | 104 | 22 | 59 | 20 | 20 | 0 | 0 | 2 | 1109 | 2.2 | 26.4 |
| Bar Benders | 226 | 58 | 84 | 43 | 39 | 2 | - | - | - | - | - | - | 6 | 226 | 1.4 | |
| Others | 2591 | 156 | 32 | 41 | 40 | 16 | 21 | 6 | - | - | - | - | 5 | 156 | .8 | |

TOTAL PLANT FLEET 29494

29494

1015.9

the specification of the equipment was sometimes imposed on the firms by inter-governmental agreements. The largest contractor alone has 400 types of equipment from 240 makers (77). This practice definitely complicated the maintenance problems of the firms, and contributed to the poor operation of the equipment in the industry.

When, in 1975, the government eased its control over imports and exports and once again allowed the private sector to handle foreign accounts, the accessibility of equipment increased. Already by May 1978, some 202 Egyptian firms were representing some 337 foreign suppliers (20). One hundred and ninety-two of the foreign firms supplied equipment and were represented by some 118 local firms. Most of these foreign firms are from Western Europe, the U.S. and Japan, compared with the 1960's when most of the equipment was coming from Eastern Europe and the Soviet Union. Another indication of the increased supply in the mid-seventies can be seen from the import figures, which show that in 1975 the value of machinery imported was double that of 1973. The value in 1970 fixed prices were LE 67.4 million and LE 32.2 million, respectively.

Obstacles still remain in equipment supply, however. Most local suppliers, acting alone or on behalf of their foreign suppliers, extend credits to prospective buyers. Contractors, especially private ones, however, have trouble meeting the collateral requirements of Egyptian banks, which still require real estate collateral and rarely extend loans against delivered equipment (76).

Alternatives to buying expensive new construction equipment are not available in Egypt. Equipment rental or leasing is

almost non-existent, furthermore, import regulations still prohibit the importation of used equipment for sales purposes. This deprives the contractor of valuable alternatives, and inhibits smaller contractors from using equipment by imposing on these firms a longer-term commitment and higher risk.

4.2.3.2 Operation

Most firms do not perform their own maintenance; only a few very large contractors are able to do so. All firms, however, suffer from a lack of spare parts and skilled repair labor. Government actions in the early 1960's reduced the number of equipment agencies in Egypt who provided the after-sale service, expertise and spare parts which minimized required equipment repair and service. Without the agencies, contractors face long repair time, excessive rework and equipment breakdown. Due to the excessive variety of equipment, firms maintaining their own equipment find it expensive to train mechanics; one contractor claimed it required one year for a mechanic and about six months for an engineer to receive training (77). Furthermore, these employees, like other construction workers, are attracted by other Arab countries. This increases the costs and reduces the quality and productivity of maintenance and repair activity.

Equipment use in the industry is inefficient. The Construction Industry Study's estimates of the hire rates for various types of equipment are shown in Table 4.25 for 1979. Using the distribution of equipment holding of each sector, from Table 4.3, as weight, each sector's equipment costs are also shown. Comparing these costs to the sector construction industry turnover yields the sector's "equipment usage rate".

TABLE 4.25

1979 Equipment Costs

Source: Reference (22)

Note All Costs are in Million LE's

| EQUIPMENT COST (HIRE RATES) | | | | | | | |
|-----------------------------|-------|--------|------|-------|-------|-------|-------|
| | TOTAL | LAND | IND | TRA | PU | HOU | BUI |
| Earthmoving | 116 | 25.5 | 15.1 | 23.2 | 17.4 | 17.4 | 17.4 |
| Excavation | 36 | 23.0 | 2.2 | 2.2 | 2.9 | 4.0 | 2.0 |
| Piling | 4 | 0 | .4 | .1 | .1 | 1.2 | 2.0 |
| Concrete Plant | 82 | 2.5 | 2.5 | 17.2 | 21.3 | 26.2 | 13.1 |
| Lifting Equipment | 22 | .2 | 2.6 | 3.7 | 4.6 | 5.7 | 2.9 |
| Road Making Plant | 14 | .7 | .7 | 9.8 | 1.4 | .7 | .7 |
| Pumping | 4 | 1.2 | .4 | .6 | .5 | .6 | .3 |
| Compressed Air Plant | 4 | .1 | .6 | 1.0 | .8 | 1.0 | .5 |
| Gen'rs & Weld'g Etc. | 12 | .3 | 2.0 | 1.5 | 2.4 | 2.2 | 2.9 |
| Site Transport | 26 | 5.2 | 3.6 | 5.2 | 4.2 | 5.2 | 2.6 |
| LE's Mill/Year @ 1979 (a) | 320 | 62.7 | 15.9 | 64.6 | 55.8 | 64.2 | 44.4 |
| 1979 Const. Output (b) | 1368 | 148 | 195 | 310 | 255 | 300 | 160 |
| Egypt % E (a)/(b) | 23.4% | 42.4% | 8.2% | 20.8% | 21.8% | 21.4% | 27.8% |
| International % E | 15% | 40/50% | 5/8% | 20% | 15% | 5/8% | 8/10% |

The usage rate in Egypt is then contrasted with an international rate (assumed by Reference 22). In some sectors the rate is unacceptable. Better equipment usage should be sought, especially in the housing and building sectors. Equipment usage in the land and transportation sectors is quite adequate. According to Reference 22, these sectors were the only ones where contractors had any kind of equipment policy and adequate maintenance programs.

In the next few years the efficiency of equipment operation is expected to improve gradually by modernizing the existing fleet and by improving the maintenance programs for the equipment as well as encouraging equipment leasing and second hand purchases. Modernization will occur through a replacement program. This program should investigate the possibilities of purchase of used equipment as well as long term leasing and renting assignments. Improved maintenance would come about through the efforts of equipment agencies in training mechanics and providing spare parts.

4.2.4 Construction Finance

The availability of adequate financing for construction projects is related to macroeconomic factors, especially national savings and foreign funds. For contractors, finance constraints exist due to a poor flow of funds from clients and difficulty in securing loans.

4.2.4.1 Construction Project Financing

Project financing in Egypt has been hampered by problems in mobilizing and allocating domestic and foreign funds. The savings-investment gap widened considerably from the mid-1960's to

the mid-1970's. As shown in Table 4.26, this was mainly due to a decline in savings and a rapid increase in consumption. Gross domestic savings dropped from 14 percent of GDP in 1965 to only 5 percent in 1974. Although this trend was reversed by 1975, the increase came mainly from increased revenues from Suez Canal, oil exports and tourism, which are all subject to international fluctuations and thus leave the local economy exposed to external forces beyond its control.

Domestic resources alone are insufficient to improve project financing in Egypt. External resources are important both in financing the government's deficit as shown in Table 4.26 and in providing funds for investment purposes. The role of these external resources became even more important after 1973. Between 1973 and 1976, the deficit on goods and services (the resource gap) averaged 11 percent of GDP as compared to one to four percent during the 1950's and the 1960's (23). Also, workers' remittances and petroleum emerged as the major foreign exchange earners (replacing cotton), while tourism and the Suez Canal earnings resurged as important contributors. The deficit on goods and services in 1978 became 2.7 times that of 1973. With negligible reserves, massive external financing became necessary to finance the deficit.

Better management of the external sector is necessary if adequate availability of foreign exchange can be guaranteed for projects in Egypt. In the past, foreign exchange has been wasted through excessive imports of luxury commodities and the implementation of inadequate projects which used foreign exchange on imports that did not yield the highest rate of economic growth possible. Also, the

TABLE 4.26

Savings and Investments in Egypt from Different Sources

Source: References (23,45)

(in LE Million)

| | 1960 | 1965 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|
| Gross Domestic Product | | | | | | | | | | | | |
| (1) | 1,443.2 | 2,304.1 | 3,508.4 | 3,241.1 | 3,389.8 | 3,644.6 | 4,197.0 | 4,861.0 | 5,828.0 | 7,551.0 | 8,602.0 | 12,474.6 |
| (2) | 1,459.3 | 2,402.9 | 3,145.5 | 3,336.7 | 3,417.0 | 3,971.1 | 4,441.9 | 5,246.6 | 6,704.6 | 8,209.9 | 9,782.4 | 12,474.6 |
| Net Factor Income From Abroad | | | | | | | | | | | | |
| (1) | 2.6 | -18.2 | -51.8 | -60.7 | -9.8 | -19.1 | -112.0 | -148.0 | -154.0 | 207.0 | 487.0 | |
| (2) | 1.8 | -14.7 | -59.2 | -62.2 | -14.0 | -32.5 | -52.6 | -16.1 | 133.0 | 433.2 | 982.7 | 784.6 |
| Gross National Product | | | | | | | | | | | | |
| (1) | 1,445.8 | 2,231.9 | 3,006.6 | 3,180.4 | 3,380.1 | 3,625.5 | 4,085.0 | 4,713.0 | 5,674.0 | 7,758.0 | 9,089.0 | |
| (2) | 1,461.1 | 2,388.2 | 3,086.6 | 3,274.5 | 3,403.0 | 3,389.3 | 4,389.3 | 5,230.5 | 6,837.6 | 8,643.1 | 10,765.1 | 13,259.2 |
| Imports of Goods and Non Factor Services | | | | | | | | | | | | |
| (1) | 290.0 | 498.0 | 573.5 | 612.3 | 648.6 | 714.7 | 1,395.0 | 1,920.4 | 1,880.0 | 2,276.0 | 2,652.0 | |
| (2) | 299.0 | 531.5 | 599.9 | 624.4 | 649.0 | 725.9 | 1,390.2 | 1,886.3 | 1,871.8 | 2,575.1 | 3,315.5 | 5,254.1 |
| Exports of Goods and Non Factor Services | | | | | | | | | | | | |
| (1) | 281.7 | 410.4 | 433.8 | 447.0 | 452.5 | 519.2 | 890.0 | 947.4 | 1,143.0 | 1,447.0 | 1,475.0 | |
| (2) | 260.4 | 409.4 | 442.1 | 451.9 | 457.0 | 541.0 | 905.0 | 964.1 | 1,151.0 | 1,772.5 | 1,945.0 | 3,251.6 |
| Available Resources | | | | | | | | | | | | |
| (1) | 1,451.5 | 2,429.2 | 3,198.1 | 3,406.6 | 3,586.0 | 3,840.1 | 4,702.0 | 5,834.0 | 6,565.0 | 8,380.0 | 9,778.0 | |
| (2) | 1,479.7 | 2,510.3 | 3,303.3 | 3,509.4 | 3,609.0 | 4,156.0 | 4,927.1 | 6,168.8 | 7,425.4 | 9,012.5 | 11,152.9 | 14,477.1 |
| Total Consumption | | | | | | | | | | | | |
| (1) | 1,259.5 | 2,015.2 | 2,771.5 | 2,977.7 | 3,167.7 | 3,393.8 | 3,942.0 | 4,506.0 | 5,160.0 | 6,470.0 | 7,373.0 | |
| (2) | 1,252.3 | 2,065.2 | 2,860.0 | 3,090.7 | 3,142.0 | 3,457.3 | 3,957.0 | 4,445.0 | 5,536.5 | 6,613.7 | 8,119.1 | 10,681.5 |
| Gross Domestic Investment | | | | | | | | | | | | |
| (1) | 192.0 | 414.0 | 426.6 | 428.7 | 418.3 | 446.3 | 730.0 | 1,328.7 | 1,405.0 | 1,910.0 | 2,400.0 | |
| (2) | 225.6 | 446.2 | 437.0 | 420.4 | 467.0 | 698.7 | 970.1 | 1,723.8 | 1,888.8 | 2,398.8 | 3,033.9 | 3,796.5 |
| Resources Gap (Imports-Exports) | | | | | | | | | | | | |
| (1) | 8.3 | 89.1 | 139.7 | 165.3 | 196.1 | 195.5 | 505.0 | 973.0 | 737.0 | 829.0 | 1,177.0 | |
| (2) | 18.4 | 122.1 | 157.8 | 172.7 | 192.0 | 184.1 | 485.2 | 922.2 | 720.8 | 802.6 | 1,370.5 | 2,002.5 |
| Gross Domestic Savings | | | | | | | | | | | | |
| (1) | 183.7 | 324.9 | 286.9 | 263.4 | 222.2 | 250.8 | 225.0 | 355.7 | 668.0 | 1,081.0 | 1,223.0 | |
| (2) | 207.2 | 324.1 | 279.2 | 247.7 | 275.0 | 513.8 | 432.3 | 785.5 | 1,168.1 | 1,596.2 | 1,663.4 | 1,793.1 |
| Current Account Deficit | | | | | | | | | | | | |
| (1) | 5.7 | 107.3 | 191.5 | 226.0 | 205.9 | 214.6 | 617.0 | 1,121.7 | 891.0 | -622.0 | -690.0 | |
| (2) | 15.5 | 136.6 | 94.1 | 106.2 | 75.0 | -31.4 | 126.0 | 524.4 | 314.8 | 205.0 | 226.1 | 1,072.7 |
| Gross National Savings | | | | | | | | | | | | |
| (1) | 186.3 | 306.7 | 235.1 | 202.7 | 212.4 | 231.7 | 113.0 | 207.0 | 514.0 | 1,228.0 | 1,710.0 | |
| (2) | 210.1 | 309.6 | 342.9 | 314.2 | 332.0 | 730.1 | 844.1 | 1,199.4 | 1,574.1 | 2,193.0 | 2,807.7 | 2,722.9 |

(1)Source: Reference (23)

(2)Source: Reference (45)

pricing and fiscal policy of the government in general led to waste due to overconsumption. Proper management of the external sector will have to include handling the foreign debt. At the end of 1978, Egypt's non-military medium- and long-term debt stood at \$9,968 million compared with \$2,485 million in 1973. Short term debt (180 day banking facilities) caused a liquidity crisis in 1977 when it increased from \$497 million in 1973 to \$1,533 million in 1977. After Arab money was used to ride over this liquidity, short-term financing was held in 1978 to \$443 million. Recently the proportion of outright grants has been reduced drastically in the composition of this debt, which will lead to an increase in the debt service payments during the 1980's (23). Efforts will have to continue to control short-term borrowing and lengthen the debt profile of the existing loans. If such actions were to be implemented, foreign exchange availability and use in the economy would improve dramatically and project financing would operate more smoothly.

4.2.4.2 Construction Firm Financing

Contractors require financing for fixed assets and for working capital. Funds may derive from within the firms, advance payments and bank loans. The requirements of contractors for finance is determined by the volume of work undertaken, by the delay between payments and completion of work, and by the amount paid in advance to or from the contractors, especially for building materials.

In Egypt, there are problems in the financial arrangements of both public and private sector contractors. First, the government and mixed sector clients are very slow in paying the mixed

sector contractor debts. Another problem is the involuntary advances paid by public and private contractors to the building materials producers to receive materials. Finally, public sector firms have incentives to take on as many contracts as possible from the government just to secure the advance payment on these contracts to use for working capital. Private sector firms in particular further suffer from difficult access to bank credit. Banks often require collateral to guarantee loans to private contractors. Their working capital requirements are also compounded by the fact that as subcontractors they are often denied advance payments.

According to the Banque du Caire, the total amount of finance offered by the banking system to the contracting sector as of December 31, 1979 totalled only LE 230 million, of which 70 LE million went to the private sector and LE 160 million to the public sector (see Table 4.27). The increase in the availability of finance is strictly controlled by the central bank and usually does not even cover inflation in the economy. This situation exacerbates the problems of smaller firms since their credit ceiling is usually reached well before the year end. The bank usually requires 20 percent cover for letters of guarantee for public sector contractors. From private firms the bank requires 20-30 percent cover in addition to some other collateral. New contractors are practically excluded from the bank's business.

To overcome these constraints, action should first be taken to expand contractors' resources through improved efficiency of their firms. Second, financing building materials production directly and not through the contractors would reduce the need for advance

TABLE 4.27

Finance from Banks to the Contracting Sector
as of December 31, 1979

Source: Reference (22)

(LE Million)

| SECTOR | ALL LOANS | CAIRO BANK |
|------------------------|-----------|------------|
| Public | 160 | 114 |
| 29 Companies Under MOH | 116 | N.A. |
| All Other Public | 44 | N.A. |
| Private | 70 | 14 |
| TOTAL | 230 | 156 |

payment. Finally, special financial arrangements for small and new contractors should be provided.

Financial Structure of Firms

An analysis of the consolidated balance sheet of 29 companies under the Ministry of Housing shows a fixed asset ratio of 24 percent of output (Table 4.28), indicating that the stock of equipment of these 29 firms is high. The ratio of equipment at cost to output (39 percent) is particularly high, bearing in mind that firms specializing in large civil engineering contracting projects are not included. The very high receivables, 64 percent from clients and 32 percent from other debtors, demonstrate the extent of the contractors' arrears and the effect of down payments to building materials suppliers. These values have been increasing rapidly since the mid-1970's. Clients receivables rose from LE 96 million in 1974 to LE 464 million in 1978. Building materials inventories (20 percent) are also high; contractors compensate for the uncertainty in the supply of these resources by hoarding. The high figure for accounts payables - current liabilities shows also that since contractors are not paid on time, they, in turn, withhold payments from their subcontractors.

The situation of current assets and liabilities explains why contractors maintain a high 16 percent buffer as working capital. Government action is required to redress these uncertainties and two other concerns of public sector contractors: the fact that contractors' arrears are non-interest bearing, and the requirement to pay taxes on profits that would only be realized if these back payments are made to the firms.

TABLE 4.28

Fixed Assets and Working Capital for 29 Companies
under Ministry of Housing as Percent of Work Done in Egypt
at December 31, 1978

Source: Reference (22)

| | <u>Percent</u> |
|----------------------|----------------|
| Fixed Assets (Net) | |
| Equipment | 19 |
| Other | <u>4</u> |
| Total Fixed Assets | 24.0 |
| Current Assets | |
| Receivables | |
| Clients | 64.4 |
| Debtors | <u>32.3</u> |
| Total Receivables | 97.0 |
| Inventory | |
| Materials | 20 |
| Spare Parts | 1 |
| Work in Progress | |
| Cash on Hand | <u>7</u> |
| Total Current Assets | 138 |
| Current Liabilities | 122 |
| Working Capital | 16 |

No data comparable to that available for the public sector is available for the private contractors, but they also in all likelihood suffer from problems of liquidity and access to credit. The accounts receivable of private firms, especially those working as subcontractors to the larger public sector firms, are probably also high. This problem is so acute that it discourages some private firms from doing work for the public sector (76). The private contractors should be assisted by training, special finance and access to equipment so that the capacity of the industry in Egypt continues to expand.

Firms Financial Management

Data on financial performance is limited. Pre-tax profits are available only for 17 firms in 1978 (Table 4.29). For these firms, average profit as a percent of turnover was 9 percent, and as a percent of invested capital, it was a high 35 percent. This suggests that despite all the problems they face, the firms are not hard pressed by market forces. Yet, room for improvement still exists. A survey of public sector companies (Reference 22) discovered their financial objectives, which stressed the value of turnover and the relationship of growth, wages and profits to this measure, to be incompatible with the efficient use of resources. Evaluating growth in current terms of turnover, a practice of public sector firms surveyed, means that the increase may not represent real growth. Relating profits to turnover is a bit misleading since profits from participation in other companies is included in the accounts of the public sector firms while the turnover of these companies is not. Return on invested capital would be a better measure of success than turnover, and would force enterprises to utilize their financial resources more efficiently.

TABLE 4.29

Financial Characteristics of Public Sector Contracting Companies 1978

Source: Reference (22)

| NAME OF COMPANY | PRETAX PROFIT LE MILLION | TOTAL TURNOVER LE MILLION | (1) AS % OF (2) % | PAID UP CAPITAL & RESERVES LE MILLION | (1) AS % OF (4) % |
|-----------------------------------------------------------|--------------------------------|---------------------------------|-------------------------|------------------------------------------------|-------------------------|
| | (1) | (2) | (3) | (4) | (5) |
| 1. Arab Contractors (Osman) | 26.0 | 237 | 11 | 69.6 | 37 |
| 2. El Nasr General Contracting (Hassan Llam) | 5.5 | 62 | 9 | 17.0 | 32 |
| 3. Misr Concrete | 1.7 | 63 | 3 | 11.4 | 15 |
| 4. Cairo General Contracting Co. | n.a. | 18 | | 4.6 | |
| 5. Atlas General Contracting Co. | 1.1 | 16 | 7 | 3.0 | 37 |
| 6. Egyptian Contractors (Mokhtar Ibrahim) | 4.5 | 32 | 14 | 7.8 | 58 |
| 7. Egyptian Contracting Co. (El Abd) | n.a. | 17 | | 2.1 | |
| 8. Nile General Co. for Reinforced Concrete (Speco) | n.a. | 15 | | 3.9 | |
| 9. Gomhouriah General Contractors (Dorra) | 0.9 | 19 | 5 | 2.8 | 32 |
| 10. El Nasr for Building & Con- struction (Egyco) | n.a. | 15 | | 4.2 | |
| 11. Arabian Contracting | 0.8 | 18 | 4 | 2.9 | 28 |
| 12. The General Co. for Construction Rolin | 0.9 | 12 | 8 | 4.0 | 23 |
| 13. Giza General for Contracting | n.a. | 7.5 | | 4.5 | |
| 14. Engineering Industrial Project Contractors | 0.6 | 11 | 5 | 3.5 | 17 |
| 15. Nile General for Bridges | n.a. | 7.6 | | 2.0 | |
| 16. Nile General for Contracting Upper Egypt of | n.a. | 9.4 | - | 2.4 | |
| 17. General Contracting | 0.4 | 6.5 | 6 | 2.6 | 15 |
| 18. Mahmoudiah for Contracting | 1.7 | 8.7 | 20 | 0.8 | 136 |
| 19. El Nasr for Civil Works | 0.4 | 9.2 | 4 | 2.3 | 17 |
| 20. Arab Co. for Foundations | n.a. | 6.7 | - | 2.3 | - |
| 21. Delta General for Contracting | 0.5 | 7.0 | 7 | 1.5 | 38 |
| 22. Red Sea General for Contracting | n.a. | 4.3 | - | 0.7 | - |
| 23. Egyptian General for Building Nasr Installations & | n.a. | 2.8 | - | 1.1 | - |
| 24. Utilities Contractors | 0.9 | 2.3 | 39 | 1.0 | 90 |
| 25. New Valley for Contracting | n.a. | 5.0 | - | 1.0 | - |
| 26. Alexandria General for Contracting | 0.4 | 3.4 | 12 | 0.8 | 50 |
| 27. Canal General for Contracting | 0.3 | 4.3 | 7 | 1.4 | 21 |
| 28. General Contracting for Sanitary Works | 0.1 | 3.5 | 3 | 0.3 | 33 |
| 29. General for Foundation Contracting | n.a. | 1.2 | - | 0.6 | - |
| | | 624 | | 162.1 | |
| Total for the 17 Companies With Profit Data | 46.7 | 514.9 | 9 | 132.7 | 35 |

The financial difficulties of both private and public sector contractors would be greatly alleviated if lending programs specifically geared to the construction industry were initiated in Egypt. Actions to resolve the arrears should be taken together with providing tax relief on sums not actually received from clients and allowing delayed payments to bear interest. Advance payments for building materials should be reduced, as should the need for advance on contracts if proper project award procedures are adopted. Finally, the performance of public sector contractors should be improved and judged more on efficiency, and contractors should be required to pay shareholders returns on capital employed.

4.3 RESOURCE CONSTRAINTS AND THEIR EFFECTS ON CONSTRUCTION SUPPLY

All the limitations discussed so far in the delivery and acquisition of construction resources in Egypt have arisen from both supply constraints and demand uncertainty. The supply has been inadequate; bottlenecks in production processes, and government intervention through price fixing and trade regulation have been major factors. Such resource limitations have imposed serious barriers on both the size of Egyptian construction output and the efficiency of contractors' operations. The predominance of resource constraints overshadows the importance of the variables that contractors can control, thus reducing the effectiveness of firm planning.

Time planning and control receive low priority on most projects in Egypt, especially on medium- and small-projects in which time is often controlled informally. Delays in the delivery of resources are frequent and often lengthy, in the cases of controlled material and the

importation of spare parts, projects may be delayed by as much as six months. This situation is aggravated by the deteriorating quality of the labor force. On-the-job training has caused slowdowns as has the misuse of equipment. Maintenance deficiencies lead to higher equipment down-time. Inconsistent quality of locally produced material, when available, often causes work stoppages; these materials often do not meet required specifications.

Such problems are also aggravated by difficulties in the importation of materials and equipment. Acquiring foreign exchange and the time required for the transportation of foreign goods cause delays. Moreover, equipment is often inappropriate because of inadequate specifications, which could be a mere oversight by the purchaser or a result of a lack of knowledge about the material being imported. Often, however, inadequate specifications stem from a lack of compatibility between foreign goods and local production. Furthermore, constant changes in the import regulations governing the types of materials and equipment imported, as well as the custom duties required, can lead to unforeseen delays in clearing the imports for use once they are in Egypt. These delays reduce the effectiveness of time control on the projects, and even the appropriateness of delay penalty clauses. They foster increasing reliance on informal controls and concentrate emphasis on how to get resources rather than on how to use them.

By far, the most measurable effect of the resource constraints in Egypt is on contractor's costs. Shortages raise prices of resources, which in turn are reflected in increased contractor's costs. The construction cost index developed in Table 4.30 (a detailed derivation

TABLE 4.30

Construction Price Indices for Differing Facility Types
(Based on Appendix III)

| Year | Residential ¹ | Industrial ² | Other Building ³ | Non-Building ⁴ |
|------|--------------------------|-------------------------|-----------------------------|---------------------------|
| 1960 | 100 | 100 | 100 | 100 |
| 1961 | 103 | 102 | 102 | 102 |
| 1962 | 105 | 105 | 105 | 104 |
| 1963 | 112 | 111 | 112 | 111 |
| 1964 | 121 | 120 | 121 | 119 |
| 1965 | 126 | 125 | 126 | 126 |
| 1966 | 137 | 136 | 137 | 135 |
| 1967 | 149 | 147 | 147 | 146 |
| 1968 | 153 | 150 | 151 | 150 |
| 1969 | 156 | 153 | 154 | 153 |
| 1970 | 162 | 159 | 160 | 159 |
| 1971 | 172 | 167 | 170 | 171 |
| 1972 | 185 | 179 | 183 | 186 |
| 1973 | 260 | 247 | 254 | 251 |
| 1974 | 286 | 293 | 281 | 270 |
| 1975 | 311 | 297 | 308 | 287 |
| 1976 | 341 | 325 | 357 | 344 |
| 1977 | 370 | 352 | 390 | 401 |
| 1978 | 403 | 381 | 426 | 467 |
| 1979 | 440 | 413 | 465 | 545 |
| 1980 | 479 | 447 | 509 | 635 |

Note: The price indices were calculated for the individual input indices using the consumption of these inputs by the facilities as weights as follows:

- (1) $0.71 \times$ material cost index + $0.23 \times$ labor cost index + $0.06 \times$ capital cost index
- (2) $0.65 \times$ material cost index + $0.27 \times$ labor cost index + $0.08 \times$ capital cost index
- (3) $0.67 \times$ material cost index + $0.24 \times$ labor cost index + $0.09 \times$ capital cost index
- (4) $0.56 \times$ material cost index + $0.30 \times$ labor cost index + $0.14 \times$ capital cost index

of which is presented in Appendix III) shows that the costs of all types of construction increased substantially from 1960 to 1977 and more than tripled between 1970 and 1979. The increase was due mainly to a sudden rise in both labor wages and materials prices between 1974 and 1976. Also contributing to increased costs were uncertainties in the delivery of building materials and spare parts, which resulted in idle time, higher prices on the black market, and higher inventory levels; difficulties in securing credit and having to pay in advance; and labor shortages and equipment maintenance problems, which caused downtime, delays and rework. Furthermore, general contractors are forced to maintain a higher level of overhead than would otherwise be necessary, because firms cannot be assured they may rehire skilled workers if laid off. Also, firms must often purchase stand-by equipment, especially with no rental market to satisfy their short-term needs.

Resource problems in Egypt complicate the quality control activities on projects. Already such practices are subject to question; a cursory look at recently completed buildings suggests that existing standards concentrate on meeting specific requirements, such as an allowable strength, rather than establishing allowable tolerance for various construction activities. As a result, enforcement of such standards is left mostly to the discretion of the participants involved. This encourages the parties to agree on tradeoffs and to sacrifice quality for other measures such as expediency or lower costs. The predominance of delays and added costs due to labor shortages, questionable quality of some materials, or material delays caused by government intervention reduce the priority attributed to quality

control. More importantly, since most of these constraints are outside the control of individual firms, their existence builds a case for sacrifices and relaxation in quality control enforcement.

In general the preponderance of these resource problems in the Egyptian construction industry increases the risks as perceived by the contractors. It reduces the importance of variables under the control of the contractor such as the usage of resources and their productivity on the job, and increases the importance of factors outside the control for the firms. This results in a low priority attributed to formal construction management techniques and reduces their possible effectiveness in improving firm efficiency.

The increased risk not only reduces the importance of planning and control; it also affects the firm's field of operations. Larger firms may seek to diversify their activities through vertical or horizontal integration; smaller firms may just shift their construction operations entirely to a new field. Many firms have already started to invest in real estate activities, design building activities, or in import/export of building materials. Such practices, if continued, will certainly pose capacity limitations that would not otherwise exist.

In general, efforts are needed to increase the supply of all resources to the industry, which would entail increasing the efficiency of production and alleviating the constraints on supply. These constraints fall into three main categories: technical, managerial, and regulatory. Solving technical problems might involve reviewing and upgrading the low quality of iron ore and the supply of scrap for steel production. Alternatives to packaging cement in paper bags must also be

studied and tested, and quality control in the production of local materials should be enhanced. Obstacles to training skilled labor have to be overcome, and the base of laborers entering the industry should be enlarged. Finally, so that the supply of management personnel can be improved, education of professionals in Egypt should be made more responsive to the needs of contracting firms.

Regulatory problems cause serious inefficiencies in the supply of many resources in Egypt. The government should stop its policies of material price fixing so that materials can be attracted back to formal markets. Rigid employment and compensation regulations imposed on public sector firm employees should be relaxed to stimulate labor productivity. Intervention in the trading of resources and preferential treatment of the public sector needs for materials, capital, or foreign exchange should not be allowed to continue. Furthermore, the constant changes in regulations should be discouraged, and consistency, clarity and stability should be the aim of regulations which impact upon the availability and consequently the prices of various resources.

A reduction in the rate of emigration and existence of the informal sector indicate that resource shortages now may not be as severe as they have been in the past; however, shortages will probably continue to exist in materials on labor in the near future. The standard approach to dealing with shortages in Egypt has been to expand production without due consideration to the potential of locally available substitutes. For example, gypsum walls may reduce reliance on bricks and cement; and small power tools can limit the need for highly skilled labor.

Expanding the existing production of resources through increased efficiency and new production capacity means estimates of demand for the resource under consideration must be available and reasonably accurate. There is clearly a need to improve the data base for such demand estimates, especially figures on the use and consumption of various materials, equipment and labor. Large disparities in demand estimates cannot be tolerated if costly plans are to be implemented for increasing the production of materials or for initiating training programs.

The government can and should use both its position as a regulator and a major industry client in implementing these recommendations. As a regulator, it should reduce its intervention in the marketplace for different resources through subsidies and allocation controls. It should continue to deregulate the trading of locally produced building materials and imports, as it did with cement. It should also encourage the increased involvement of firms and the attraction of new firms to the industry, especially by using incentives as it did in the foreign investment and joint venture laws. As a client it should investigate relations other than the traditional, fixed price general contractor. Such actions, if adopted, can reduce the present risks borne by the contractors and the adverse impacts of variables beyond their control. Firms should then be able to focus their attention on the internal variables affecting their performance.

CHAPTER V

THE REGULATORY ENVIRONMENT

The government plays two roles in the construction industry in Egypt, overseer and participant. Government participation in the industry, often as a client but also as a contractor, supplier, or even professional, has increased markedly since the early sixties. The nationalization of construction and other economic sectors created a large public sector with direct control over most large contractors and production facilities. Although the government has gradually shifted policy to stimulate the private sector, numerous financial and technical laws, regulations, decrees, and codes continue to directly and indirectly effect the construction industry.

5.1 REGULATING CONSTRUCTION ACTIVITY

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

The government has controlled the economy and construction in Egypt mainly by controlling investment planning. This has been supplemented by a series of regulations directly governing land use laws, physical planning regulations, building codes, standards and codes of practice, among others.

5.1.1 National Planning for Construction

Since 1959 the government of Egypt has centrally planned all public and private investment through Five-Year Plans and annual, step-by-step implementation plans and budgets. These plans are prepared by the Ministries of Planning and Finance and Economy, with input from other ministries and the governorate where these projects will be implemented.

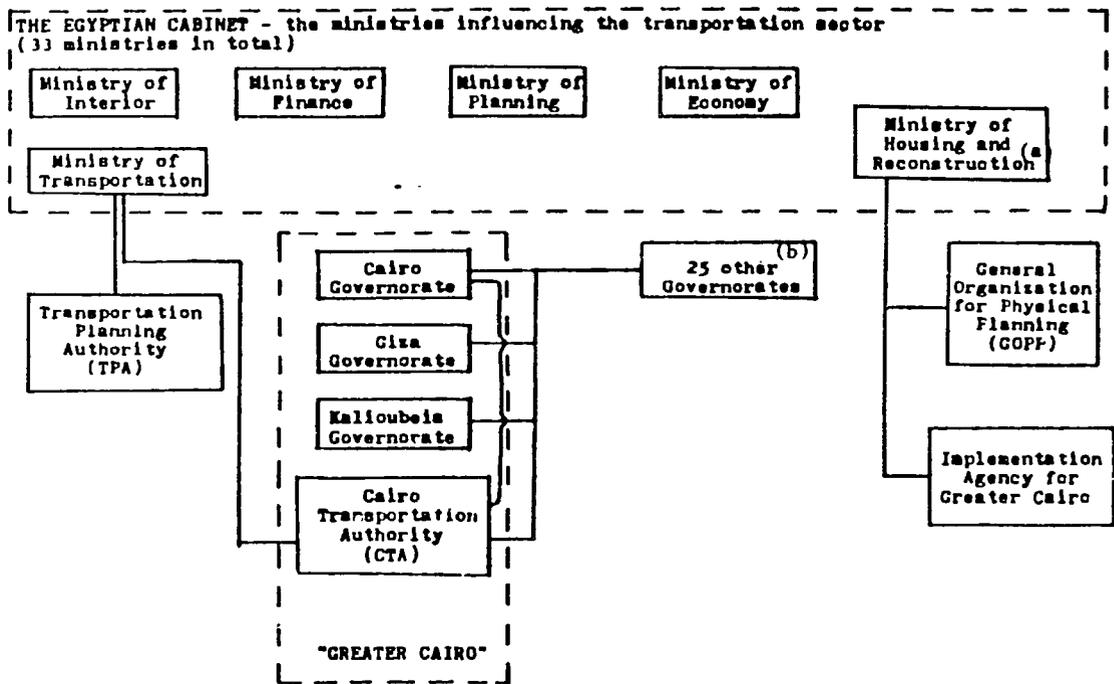
Because construction constitutes such a large part of investment in almost all sectors of the economy, planning for the sector closely parallels planning for the entire economy. The complexity of this process can be appreciated by the myriad of organizations interacting in the development of just one type of construction project: transportation projects (Figure 5.1). Planning for construction is also largely disjointed. The Five-Year Plans, with the exception of the 1978-82 Plan, detail only broad targets, objectives and policies for each sector. The yearly plans and budgets make explicit the outlays necessary for specific projects by each sector necessary to achieve the medium range plans. Law 70 (1973) which regulates the preparation and follow-up of the government's general plans, stipulates that a national plan must use exclusively national resources and centralized planning, and assign a major role in the economy to the public sector. This law requires the Ministry of Planning to perform the central planning activity assisted by other government planning bodies and defines the process of preparing the plan and its approval and follow-up.

The Ministry of Planning prepares a general framework for a long- and medium-term plan for discussion in the Cabinet and the Party, after which it is submitted to the Peoples Assembly for approval.

FIGURE 5.1

GOVERNMENT ORGANIZATIONS INVOLVED IN THE DEVELOPMENT AND IMPLEMENTATION OF TRANSPORTATION PROJECTS IN THE CAIRO METROPOLITAN AREA

SOURCE: Reference (18)



(a) The Ministry of Housing and Reconstruction has since been divided into two ministries.

(b) Governors are now members of the Council of Ministers themselves (78).

To fulfill the objectives of this framework, all ministries and authorities at all levels of government submit to the Ministries of Planning, Finance, and Economy, comprehensive alternative proposals of their plans, including their plans for the private sector in their field. From these alternatives, the Ministry of Planning prepares the yearly plan that is then presented to the Peoples Assembly with the budget for approval.

In practice, however, this process does not provide continuity between the five-year and annual plans. The government frequently changes its priorities, from industrialization in 1978, to communication and transportation in 1979, to food self-sufficiency and housing in 1980 (22). Also, localities lack qualified personnel to interact with the central government. Third, the annual plans are often mere compilations of the perceived needs of the preparers and do not take into account how much money is likely to be available. Finally, the Five-Year Plans are expressed in prices of the year they are prepared with no mechanism to make adjustments based on inflation.

Price changes of the projects under consideration are conspicuously missing from the list of factors required by Law 70 (the estimation of the national product in constant and current prices; labor requirements; the investment necessary to execute the projects; the value of national savings available, consumption, and import/export resulting from the plan). In reviewing sectoral proposals, the Ministry of Planning scrutinizes the largest projects to ensure that they are reasonably planned, but solicits no information on the expected future prices of these projects (22). Project costs can be calculated on fixed prices or include allowances for price changes, though whether such

allowances are appropriate cannot be verified. Furthermore, because most projects have been initiated in previous years and usually inadequately reflect price changes, financial provisions may be insufficient to complete construction.

Plans may also grow in two unplanned ways. First, the planning process does not allow for contingencies. Projects arising from emergencies are added to the following year's plans by the ministries without dropping other projects. Unplanned increases also occur due to direct orders, frequently extended from year to year, placed by government agencies with contractors. Although this practice has been discouraged it has not been completely stopped.

Law 70 and the planning process also do not adequately consider construction industry capacity as a critical factor in the successful implementation of any plan. As was shown in earlier chapters, the monetary demand figures advanced for the industry are not correctly transferred to actual resources because of inadequate consumption coefficients. While the law currently requires the MOP to follow-up on the actual implementation of the overall plan on a quarterly basis, the Ministry appears to do so only in monetary terms, this means that the planning process inadequately covers the resource requirements of the industry.

In 1980, Law 119 created the National Investment Bank (NIB) under the MOP to provide financing for the plan, follow-up on project implementation and monitor disbursements. This separation of the project approval and implementation process could improve substantially the national planning process. Yet, the creation of the bank also could complicate the already complex project cycle by

interjecting one more agency into the system. While it is too soon to predict how successful the NIB will be, any reform of the existing planning process, especially one involving a stronger role for MOP in project choice and follow-up, is badly needed if construction planning is to improve.

5.1.2 Relations Between Main Participants

In Egypt, contracting is governed mainly by Civil Law 131 (1948), which defines the broad responsibilities of the client and professional as well as the contractor. The contractor may supply both labor and materials or only the labor. 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. If the contractor does not comply within the specified time, the owner may correct the mistakes at the expense of the contractor; he may also annul the contract if the damage is irreparable. The contractor may subcontract 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 unless the contract stipulates otherwise. If the contract is on an estimated or 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 without compensation for foregone profits due to noncompletion of the work. If the contract is lump sum, based on a particular design, the contractor cannot claim any increase in payments. If the price was not agreed upon beforehand, it is set by the value of the work and the

contractor's expenses. In the case of nonpayment or delayed payment by the contractor, subcontractors and employees of the contractor have the right to ask the client directly for any money owed, but this is not to exceed the amount outstanding to the contractor at the time.

Civil Law 131 (1948) 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; this amount may be determined by a court. The contract may also be terminated if it becomes impossible to execute the work. If the facility suddenly collapses, the contract is terminated and compensation depends on the cause of this collapse. The death of the contractor, in the case of a proprietorship, terminates the contract only if it was dependent on his personal ability.

Under Civil Law 131 (1948), the relationship between the client and professional may be contractual, whereby the latter performs a specified task for the former without coming under his direct supervision, or the professional may represent the client as his agent in the execution of the project, at times even holding power of attorney. Payment for the design and associated documents and for supervision of the construction are to be separate. If the amounts are not specified in the contract, they are to be estimated according to standard practice. If the work is not performed in accordance with the prepared designs, the professional is compensated on the basis of his time. The contract does not differentiate between initial design and changes or redesign during project execution.

Civil Law 131 (1948) requires the contractor and professional to mutually guarantee a structure against collapse for ten

years after turning the facility over to the client. Their responsibility is limited to defects affecting the structural integrity and safety of a fixed facility, and does not include internal decorative works, road paving, or well and canal digging. Where the professional's role is restricted to design, he is liable for design defects which must be proven by the client. For this reason, the Egyptian Syndicate of Engineers' Code (13) states that a design contract should not be subcontracted to another professional.

Law 106 (1976), which governs building construction, also pertains to relations between participants in contracting activities over LE 5,000. Under this law, an owner is required to have designs certified by a registered architect or engineer and to engage a professional engineer to supervise construction. The new law holds the contractor liable for the mistakes of an owner in failing to apply for licenses for the facility by making him pay half the value of illegally-contracted work. Law 106 (1976) additionally requires owners of structures exceeding LE 10,000 in value to purchase insurance for the civil responsibility of the professionals and contractors for any damages affecting the owner or any third party incurred at any time from construction through the ten-year guarantee period stipulated in Civil Law 131 (1948).

These two laws specify the responsibilities and contractual procedures of the various participants in construction. The Egyptian Syndicate of Engineers has gone somewhat further, and enacted a code of practice for professionals (13) which details the professional's responsibilities, guarantees, and compensation, alternative contractual formats, and so forth. Contractors, however, do not have such a

syndicate or organization representing their interests; rather, their responsibilities and contractual agreements tend to be largely defined by the clients and professionals on a case-by-case basis, even in public sector operations. Moreover, while the Syndicate of Engineers has defined standard forms for client-professional contracts, there appear to be none for client-contractor contracts except those involving the government.

The Syndicate's Code has several features which impair efficiency. Calculating a professional's fees as a percentage of the value of construction might induce him to reduce project costs. The allocation of work and schedule of payments allow construction to begin only after all working drawings are finished. Entrusting working drawings to the contractor might accelerate construction and reduce future claims. Categorizing design efforts by type of structure for the purpose of determining fees does not compensate the level of effort required as fully as might a man/months approach, although this compels the client to prepare detailed requirements for the professional in order to determine the appropriate fee. While the Code of Practice and Fees of the Syndicate of Engineers is flawed, it does provide valuable guidelines to professionals in construction in Egypt. A similar organization and code could potentially be of considerable administrative and technical value to contractors in Egypt.

5.1.2.1 Owners and Users

Until now, "owners" and "users" have been treated as one in the same. In practice, of course, owners lease to users in rental markets. In Egypt, rented urban housing is heavily regulated. The nature and extent of rent controls are only briefly touched upon

here, as the MOHRAID report on urban land use (27) discusses the subject in considerable detail.

Rent controls were instituted thirty-five years ago in Egypt. In 1969, Law 52 established the system of basing rents on a percentage equal to 8 percent of construction costs and 5 percent of the land cost per unit. Because official construction costs used in developing these figures seriously underestimated actual costs, and land values were questionable, Law 49 (1977) revised this system. Rents are now being assessed on the basis of 7 percent of both land and building values plus 3 percent of the executed value of the building to cover depreciation. The law also allows real estate taxes to be passed on to tenants. Land value is based on 1974 prices with an annual increase of 7 percent until completion of the building, and actual construction costs are used. Law 49 also permitted land values to be revalued if improvements are made in the facility more than two years after construction.

In 1979 a new law regulating the relations between tenants and owner was passed. But even the enactment of the new law has not changed the fact that controls make it difficult for investment in housing to compete with other investments. This, in addition to favorable legal rulings on tenants' rights, slowed investment in housing, especially for low and middle-income units, although sale of condominiums and rental of furnished flats has increased. Rent controls have also fostered "key money", that is, a fee charged by owners to compensate for the difference between actual costs and regulated rents, and by tenants in surrendering a rented apartment for secure lodging. Neglect of building maintenance has also resulted from such regulation.

These issues are the subject of considerable debate in Egypt today.

5.1.2.2 The Government as Client

The government as a client is also regulated by laws, regulations, and decrees, in particular Law 236 (1954) concerning the organization of contract letting and Decree 542 (1957) regulating contract letting and purchase. These decrees stipulate that any work done for the government must be contracted through public tender, limit direct orders, and restrict the amount of work the government can contract to the private sector. The restriction that any work whose value exceeds LE 500,000 per year be reserved for public sector contractors and cooperatives was lifted by presidential decree in February 1978.

Decree 542 (1957) required that specifications be prepared properly before advertising tender and that ample time for response be allowed. Contractors are expected to comply fully with the stipulations of the tender documents when bidding. Failure to do so carries a stiff penalty. If a contractor omits an item, the regulations authorize the government to use the highest unit price quote for comparison, and the lowest for the terms of payment. In contrast, in delivery contracts, omission is considered as abstention from bidding on the particular item by the supplier.

The practice of direct orders was introduced in contracting by Decree 147 (1962), which permitted the Minister of Housing to issue direct orders to contractors to perform work in the Economic Development Plan of Egypt. Outside this ministry, direct orders were permitted in contracting work whose value did not exceed LE 500. Under direct orders, prices were set by a committee comprising the

contractor, the client, and a representative of the Ministry. A State directive in late 1977 mandated a return to competitive bidding, even for the Minister of Housing, to rectify what were perceived as problems caused by this practice: projects were initiated without proper technical and financial preparation, and competition in contract award was eliminated. The results of this shift back to competitive bidding have yet to be observed.

These regulations favor public sector contractors in government-contracted work in at least two ways. First, 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 enforced rather arbitrarily in Egypt. This, together with the lack of formal classification of contractors, handicaps small contractors. Secondly, any bid submitted to a government agency by anyone other than a general authority must be accompanied by a temporary bid guarantee of no less than 2 percent of the total value of the bid and all sub-contractors' bids. This guarantee may take the form of cash, a bank guarantee drawn on an approved local bank, or the withholding of amounts due the contractor from the agency. Most private sector contractors interviewed claim that in practice public sector contractors receive preferential treatment in acquiring bid guarantees from banks, and that agencies allow them to participate even without such guarantees.

Upon contract award, the contractor has ten days to deposit five percent of the value of construction awarded and ten

percent of the value of other deliveries as a performance guarantee. This guarantee has to be maintained at 50 percent of its value throughout execution; otherwise the contract is automatically broken. In this case the agency also has the right to perform the work at the contractor's expense, and to sue for damages.

Under the general conditions of contracts with the government, a contract comes into force with the delivery of the site to the contractor. 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 including banks without the written consent of the client agency. Even with such consent, the contractor is held fully responsible with the new party for the execution of the contract. The contractor bears all costs associated with following the various laws and regulations such as fees for building permits. He 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. Furthermore, it reserves the right to alter the contract by 25 percent, up or down, without having to compensate the contractor, a right which is suspected of having an inflationary effect on the contractor's bid.

Decree 542 (1957) instructs the agency to pay the contractor in installments according to the progress of the work, with no mention of an advance payment to the contractor. The installments are defined as: 95 percent of the value of the work executed according to the unit costs of the contract, and 70 percent of the value of the materials stored for inclusion in the facility as estimated by the

agency. The contractor is compensated for the quantities actually handled. The contractor cannot claim any increase in unit price due to changes in the quantities, and any conflict over the measurement of quantities is resolved by the client agency.

The contractor is responsible for finishing his construction within the allotted time, and is fined for any delays as follows: (a) 1 percent for up to one week; (b) 1.5 percent for one to two weeks; (c) 2 percent for two to three weeks; (d) 2.5 percent for three to four weeks; and (e) 3 percent for any period exceeding four weeks (alternatively, 3 percent for the fifth week or portions thereof, and 5 percent for each month thereafter).

Preliminary delivery occurs as soon as construction is complete and the contractor has cleared the site. At this time the contractor collects any amount due him other than the amount of this performance guarantee. One year later, the contractor guarantees the performance of the facility for ten years, as stipulated in Civil Law 131 (1948). At this time, the contractor's performance guarantee is released.

5.1.3 Controlling Construction Work

5.1.3.1 Physical Planning Process

The present land development process in Egypt is largely geared to meet the needs of its growing urban population. The MOHR-AID report on urban land use (27) characterizes this process as having two levels of decisions: one at the national government level, to expand or redevelop existing cities or to establish new ones, and the other at the city and local/individual level, to develop specific projects within or outside the bounds of the existing laws. However,

there is no overall planning framework through which individual projects might be related to city-wide plans and priorities for development. Rather, construction projects are regulated in an ad-hoc fashion by a series of laws and regulations that address specific aspects of development rather than the overall plan for physical development. Law 52 of 1940, amended by Law 2 of 1952, for example, regulates the subdivision of land for building purposes, but it is primarily concerned with specifying minimum road widths, lot sizes, public areas, and so forth. A myriad of regulations govern the designation of industrial areas (Law 29 of 1949), the installation and construction of tourism facilities (Laws 1 and 2 of 1973), the private use of public thoroughfares (Law 140 of 1956), the creation of new cemeteries (Law 5 of 1966), and the development of ponds and swampy areas (Law 177 of 1960). There simply is no procedure which permits orderly urban development by organizing these various regulations into a coherent plan. Such a framework might be provided by the law governing physical planning. A draft of this law has been in existence for many years but it has not yet been passed by Parliament.

Law 106 (1976) directs and organizes urban building construction whose value exceeds LE 5,000 in a two-step procedure. Investments in private housing must first be approved at the governorate level by a committee designated by the Ministry of Housing to determine its compliance with the local allocation of the housing budget for the private sector. Second, a local permit/license must be issued for the construction of each facility. In industrial construction, the Ministry of Industry, through the General Organization for Industrialization, must approve a project before any permit/license can be sought for

actual building. Regulated building materials, namely cement, steel, wood, and glass, are allocated to the governorates on the basis of planned investment, and permits for their purchase are distributed in conjunction with the building permits/licenses.

The standards in the current subdivision law, and the laws organizing building construction, are rather high for developments in low-income areas, and the regulations directing building are overly strict. Because of the shortages in personnel and funds at the local level, their enforcement has also proven to be difficult, and led to the classification of many private sector developments as informal (i.e. illegal). But because such construction responds to the needs of the burgeoning urban population, these developments are usually legalized. Law 29 (1966) legalized certain illegal subdivisions of land in order to provide them with utility connections.

5.1.3.2 Standards and Codes of Practice

Building standards, controlled by ministerial decree, have long tended to concentrate on aspects rather specific to housing. Ministerial Decree 169 of 1962 (recently superseded by Ministerial Decree 237 of 1977) has been the primary regulation governing standards; it specifies building height, ceiling height, lighting, ventilation, stairways, sanitary services, and so forth. Only in 1976 were general standards such as Decree 93 (1973) for using blocks in buildings, Decree 96 (1974) for painting activities, Decree 54 (1973) for steel and bridge construction, and Decree 95 (1974) for building embankments, adopted for specific activities of construction.

Specifications for building materials are written by the Egyptian Organization for Standardization (OES), established in

1957, under the aegis of the Ministry of Industry. Adapted from foreign standards, they are adequate, if out of date (22). Compliance with OES standards is voluntary except for those pertaining to health, safety, and exports, or when incorporated into a legal document. The United States National Bureau of Standards is currently participating in a joint project with the OES to develop the capability of the Egyptian Standards Information Services (22).

In 1964, Law 106 authorized the Ministry of Housing to issue codes of practice for the design and execution of certain construction works. The Ministry established 10 standing committees to develop these codes, yet, as of 1978, only four codes had been published and even those are largely unknown. New codes of practice are required both to encourage the introduction of new construction techniques and to formalize the use of existing ones. The General Organization of Housing, Building and Planning Research, in association with the British Building Research Establishment, is currently updating existing codes and preparing new ones (79).

5.1.3.3 Contract Documents and Tendering

There is no standard set of documents for construction work in Egypt, although existing documents are similar in that they conform to Decree 542 (1957), issued by the Ministry of Finance. The normal documents comprise: conditions of contracts, specifications, and bills of quantities.

Conditions of Contracts

There are two broad types of contract conditions used in Egypt: those of foreign origin and those of Egyptian origin. Foreign origin conditions are used on projects with overseas funding,

consultants, or contractors. In these cases, contract forms may be either foreign national such as those of the American Institute of Architects or the United States State Department, or international, particularly that of FIDIC (The International Federation of Engineering Consultants). The Egyptian contracts generally conform to Decree 542 of 1957. Similar forms are used for both building and civil engineering works. Figure 5.2 shows excerpts from typical contract conditions.

In Egypt, the conditions of contracts generally favor the client. The contract fails to assign fairly the rights, liabilities, responsibilities, and risks between the client and the contractor. For example, the conditions ignore force majeure, as well as client default as a justification for delay or noncompletion. Moreover, no mention is made of arbitration as a means to settle disputes, nor of increased prices, except in cases of variations in the amount stated in the contract. While penalties for delays are established, there exist no bonuses for early completion. Finally, clients take no responsibility whatsoever in the quality of production information delivered to the contractor, while the contractor is responsible for the safety of the work for a ten year period.

Specifications and Bills of Quantities

Egyptian construction uses a standard specification format for substructure, plain concrete, reinforced concrete, masonry damp proofing, plastering, tiling and flooring, stains, marble works, joinery, metalwork, painting, sanitary work, electrical 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 project, a practice which leads to wide discrepancies in the content of

FIGURE 5-2

Excerpts From Typical
General Conditions of Contract

Source: Reference (73)

- Article 2: Object of the Contract
- Article 28: Completion of the work and penalties for delay
- 1% for first week
 - +1.5% for second
 - +2% for third
 - +2.5% for fourth
 - +3% for more than four weeks
 - maximum not more than 10%
- Article 34: Unit Rates and Quantities. Rates to be all inclusive. Quantities are meant to indicate the scope of the work but payment will be made on the basis of the actual work executed.
- Article 36: Prices are not subject to any claims for increase.
- Article 38: Payment and Deductions
1. (a) advance payment of 20% against letter of guarantee to be recovered by deducting 20% from each payment due.
 - (b) 95% of the value of work executed
 - (c) 75% of the value of materials on site
 - (d) 50% of the value of joinery or metal work manufactured away from the site against a letter of guarantee and an insurance policy for fire and theft
- Article 39: Additions or omissions can be made to the contract up to 25% in value and the unit rates will remain valid. if outside this limit then claims can be considered.
- Article 40: Correction of Errors in the Specification or Drawings. The Contractor has to check the design and drawings and is wholly responsible for the safety of the construction. This also applies where the building is on foundations made by others (the contractor is required to make all necessary investigations).
- Article 47: Interpretation of the contract. Signing the contract documents shall be taken to mean acceptance of all the contract conditions. Any particular case not covered by the contract conditions shall be looked into according to "Procedures for Sale and Purchase" Decree No. 542 of 1957.

specifications. Despite this, the main problem with specifications is an apparent lack of compliance with the content rather than the content itself.

The use of bills of quantities is common in Egyptian construction. The breakdown into work items is similar to that in the specifications. Bills are prepared by the architect and engineers, as quantity surveyors do not exist in Egypt. These bills provide an adequate record of the content of construction projects and serve as a basis for payments. However, because their format and methods of measurement are not uniform (22), they cannot be used by management as tools with which to analyze costs.

Tendering Procedures

In the past, the process of tendering in Egypt discriminated between the public and private sectors of the economy. Prior to revision in 1976, direct orders on many government and public sector projects were the norm. Today, however, is competition is encouraged.

Competition can either be open or selective. The selective method, whereby a select list of contractors that the client considers capable of doing the work is invited to bid on a project, is becoming the most common method. To properly apply this method, the "prequalification" of contractors must be complete. This procedure would be improved considerably if contractors were registered according to their capabilities, perhaps by the government or an independent organization.

In the private sector, selective tendering and negotiations are the most common procedures. It is not clear, however,

to what extent negotiation has determined the price on government projects, even after the abolition of the direct order process. Tenderers frequently qualify their bids and link them to conditions of advance payments; availability, source, and price of materials; custom duties and exchange rates; and duration of contracts. Given the drawbacks outlined earlier in contract documents, this is to be expected. This practice, however, by removing the basis of comparison, makes evaluating bids very difficult.

Action must be taken to improve competitive tendering. One means would be to ensure that if contract conditions differ from those of the invitation to tender, all tenderers be invited to resubmit under the new conditions. Another would be to adopt a code of procedures for competitive tendering, to be agreed upon by all participants, with no distinction between the public and private sectors.

5.2 REGULATING RELATIONS BETWEEN PARTICIPANTS AND THE GOVERNMENT

In Egypt, no single body of law regulates companies, rather, firms are subject to the stipulations of the Civil Code, Commercial Law, Company Law 26 of 1954 superseded by Law 159 of 1981, Foreign Investment Law 43 for 1974 as amended by Law 32 of 1977, and the public sector laws beginning with 117, 118, 119 of 1961 and 82 of 1963 through Law 111 of 1975. In addition, various laws governing registration, capital markets, and taxes, directly affect any company's operations. Egyptian legislation differentiates three types of firms according to ownership of capital: (a) local private, (b) foreign, and (c) local public. Law 159 of 1981 has yet to completely integrate local and foreign private capital, let alone public sector capital.

5.2.1 Company Formation

Business law in Egypt recognizes several forms of firm organization: proprietorships, partnerships, and corporations (which may be in the form of sole proprietorships, general partnerships, and limited partnerships). Under Law 26 of 1954 and its various amendments, three types of corporations are recognized in Egypt: Joint Stock Company, Limited Liability Company, and Partnerships Limited by Shares. The Joint Stock Company, the most common form of corporate business structure, must be approved by ministerial (formerly presidential) decree, deeds relating to its formation must be published in the official gazette, and it must be registered with the Ministry of Economy. At least three persons and LE 250,000 for companies formed by private subscription and LE 500,000 for those formed by general subscription are required to found a Joint Stock Company. At least 49 percent of the shares must be offered first to Egyptian nationals. Only after two fiscal years can the company be listed on the stock exchange and shares traded on the open market. Labor and staff participation in company management may take one of three forms: (a) board representation; (b) establishment of employee shares; or (c) creation of an employee committee which assists the board. Annual remuneration for board directors cannot exceed 10 percent of net profit. A person may serve as chairman of one board and a member in two, unless he owns more than 10 percent of the shares. The only legal reserve is 5 percent of net profits. Employee profit sharing must be no less than 10 percent of distributed profit and no more than the employees' annual salary. Five percent of net profits are to be set aside as legal reserve.

The Limited Liability Company, recognized since 1954 as a form

of organization for companies outside banking, investment, and insurance, may have a maximum of fifty partners; shares cannot be offered to the public. If there are more than ten shareholders, a board of control of at least three persons must be formed. A minimum capital requirement of LE 50,000 was established in 1981 by Law 159.

The statutory requirements for Partnerships Limited by Shares are similar to those for the Joint Stock Company. At least one partner, however, must assume unlimited responsibility for the company's liabilities, while the other partners are limited to the nominal value of their shares. The partnership must be registered with the Ministry of Trade. A board of control is required. In 1981, the minimum capital requirement was raised to LE 250,000.

Law 159 (1981) stipulated some general labor requirements for all three types of companies: (a) at least 90 percent of employees must be Egyptian, and their earnings must represent 80 percent of the total for all employees; (b) at least three quarters of technicians must be Egyptian, and they must draw at least 70 percent of the wages for this category. The Minister of Economy may allow exceptions to these requirements if skilled workers are unavailable. Companies in which government holds 25 percent or more of total share capital are treated as joint stock companies. As part of the public sector, however, the government appoints their boards of directors and organizes their operations in accordance with Law 60 of 1971 (amended by Law 111 of 1975).

In theory, foreign investors may organize any of these types of companies, though the participation of some public or private Egyptian capital is required. In practice, however, Law 43 of 1974, as amended

by Law 32 of 1977, limits the corporate form of these businesses to the joint stock or limited liability company. This same law extends to Egyptian capital in specified fields such benefits as exemption from labor's participation in the board of directors, profit sharing, making 49 percent of the shares available to the public, and regulations governing the remuneration of managers and their involvement with more than two companies. Companies and projects licensed to operate in the Free Zones by the General Organization for Investment of Arab and Foreign Capital and Free Zones, moreover, are exempted from many Egyptian laws.

5.2.2 Company Registration

All commercial entities in Egypt must regardless of legal status and capital ownership register with the Commercial Registry (Law 34, 1976). In the construction sector, this primarily affects contractors and suppliers and a smaller number of developers and owners of commercial and industrial buildings. Professionals are exempted from such registration, as their consulting is not considered a commercial activity (see section 3.3.1).

To register in the Commercial Registry, the firm must be Egyptian and be licensed by a local Chamber of Commerce. There are two dozen Chambers of Commerce, geographically dispensed. The basic requirements to register as a contractor introduced in 1976 are an appropriate engineering degree, ownership of the equipment of the trade, or a record of contracting with the public sector. The local Commercial Registry issues the contractor a registration number, which allows him to work anywhere in Egypt. The supplier is similarly registered. Registration is reviewed every five years, and tax and social security

offices monitor compliance with the law. Law 34 of 1976 extends registration to foreign firms operating in Egypt approved by the General Authority for Investment and Free Zones.

Because the Commercial Registry deals with firms on an individual basis, its serial system does not differentiate among contractors, suppliers, storekeepers, and all other commercial entities. The extent of prequalification in this registry or in the more specialized registries is also rather limited. An effort to institute a cross registration system by economic sector was begun in 1974, but was abandoned in mid-1977 as too costly and burdensome. Efforts such as these to improve the information base pertaining to construction and other sectors of the economy should be fostered. The Office of Private Sector Contractors in the MOH, with which private contractors who wish to work for the government must register, already has a considerable amount of information on individual contractors which it might usefully begin listing and categorizing. This office might also begin looking more closely into a proper qualification procedure for contractors.

Regulations governing the registration of commercial representation and agency have been in a constant state of flux since the mid-seventies. These regulations have an obvious impact on import/export activities which in turn affect the construction industry. Law 93 (1974) allowed Egyptian individuals to act as commercial agents for foreign companies, and Law 118 (1975) permitted private firms to reenter import/export markets. These activities have since flourished in Egypt, As of May, 1977, 12,275 private concerns had registered with the Commercial Registry as import/exporters, and by December 1982, this number had jumped to about 17,000 (14). Also, by July 1978, there were

as many as 931 commercial representatives in Egypt representing some 1300 foreign companies (79). Foreign companies offering scientific, technical, commercial, and other services must have a commercial agent in Egypt before they can begin operations.

In July 1982, Law 120 organized the operations of commercial agents, and Law 121 created a register of importers. These laws, which effectively repealed Laws 93 (1974) and 107 (1961) took effect in May 1982. They transferred some of the functions of the Commercial Registry from the Ministry of Trade to the Ministry of Economy. Also, they revised slightly the registration requirements previously in effect. Whereas under Law 93 (1974), to be eligible to act as a commercial agent, individuals had to be Egyptian, born of an Egyptian father, and have resided in Egypt for five years prior to registering in the Commercial Agent Registry, the new law permitted naturalized Egyptians to qualify as agents 10 years after naturalization, and eliminated the five year residency requirement. Companies registering as an agent were now required to be completely owned by Egyptians. Furthermore, the new law broadened the definition of agency to include commercial intermediation, and extended its applicability to single transactions. The law renders ineligible individuals in the government and their close relatives, reflecting government concern with corruption. The new law unfortunately still does not clarify the geographical, duration, or exclusivity aspects of these contracts, leaving these to be settled in each contract negotiation (67).

5.2.3 Taxation and Record Keeping

Law 14 of 1939 established the basis of today's tax

system. The latest in a series of tax laws amending this basic statute, Law 157 of 1981, was intended to reform the tax system, which consists of:

- (1) income taxes, levied on income from movable 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;
- (2) capital or wealth taxes, levied mainly on inheritances (divided into two parts under Law 142 of 1944 and Law 159 of 1952), and a real estate transactions tax (under Law 46 of 1978); and
- (3) indirect taxes, including fiscal stamps, customs duties, entertainment taxes, and excise duties.

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 Egypt. Activities abroad are taxed only when they are being administered from within Egypt. Individuals and full partners are exempt if their net profits fall below LE 720. Companies subject to Law 43 of 1974 are exempt for five or eight years, depending on the decision of the Investment Authority. Corporate and individual income from trade and business are no longer treated as one and the same.

The commercial and industrial tax is charged at the following rates for proprietorships and partnerships:

20 percent on the first LE 1000 of taxable profit

23 percent on the next LE 1500

27 percent on the next LE 2000

30 percent above this amount.

Corporations are taxed at a rate of 32 percent except for companies working in oil exploration, where the rate is 40.55 percent.

Furthermore, industrial corporations with 50 or more employees are exempt from paying tax for five years.

The commercial and industrial tax is levied on net profits. Deductible as operating expenses are rents, actual depreciation, 25 percent of the cost of new equipment, other taxes, and donations (to government any amount, to private charity up to 7 percent of net profits). Also deductible are employees' social insurance, contributions to pension (maximum 20 percent of payroll), 90 percent of income from movable capital in company's assets provided tax on the income has already been paid, and 90 percent of the income from real property provided it is included in the total income of the enterprise. Past laws disallowed the deduction of reserves for tax purposes. Law 46 of 1979 allowed allocations covering sure losses for up to 5 percent of net profits to be deducted. This practice stands under Law 157 of 1981. Realized end-of-year losses can be carried forward over a maximum of five fiscal years. Corporations, in addition, can deduct their employees' share in profits, the board of directors' remuneration, and per diem for stockholder attendance at general assemblies. Capital gains from sale of assets is taxable unless if the money is used to replace the asset and improve production during the same fiscal year. The tax office sets certain standards for depreciation, and allows the use of the constant or declining balance methods.

Record keeping has been required of commercial and industrial establishments since 1883. Since 1954, commercial records have been mandatory for businesses whose capital is above LE 1,000. Tax declarations and documents showing the company's financial position must be signed by a certified auditor for all corporations, and for individual companies and partnerships if their capital exceeds LE 10,000, their profits surpass LE 5,000, and their sales are more than LE 50,000 per year. The executive regulations of Law 159 (1981) stipulate as proper documentation:

- a daily ledger
- a secondary daily ledger (such as bank ledger, purchasing ledger, or sales ledger)
- general and secondary ledgers
- an inventory ledger recording assets and liabilities of the establishment
- a types-of-goods ledger, only held by wholesalers
- the original of all contracts, receipts, and correspondence from other establishments, and copies of their own correspondence.

It is not clear on what basis the tax office does not accept company documentation, especially that of small firms. Reasons cited for rejecting documentation include inadequate documentation to support ledger entries, failure to register certain transactions, mistakes in the inventory ledger, and a questionable reduction in gross profits (79). When documentation is rejected, the tax office itself estimates the establishment's profit. Such estimates, often arbitrary, are based on: the capital of the establishment; a comparison with

similarly organized companies that keep books; the number and type of pieces of equipment owned; and checking with suppliers.

The Cairo Tax Office for Construction assumes an arbitrary percentage as taxable profits for small private contractors. It claims this amount to be 5 percent of total income for contractors, although other industry participants alleged this figure to be as high as 20 percent. Since 1974, one percent of all payments to contractors have been designated as withholding, and forwarded directly to the tax office to be credited toward the contractors' annual taxes. Table 5.1 suggests that this might indeed have increased tax revenues, although it remains unclear how enforceable this tax is, particularly in private construction.

In sharp contrast to this rather liberal accounting system for the private sector is the Unified Accounting System required of all public entities except banks and insurance companies since fiscal year 1967/68. Under this system, all companies must begin their fiscal year on the same date, index their accounts using the same system, follow basic accounting rules, use uniform final statements, and prepare uniform planning budgets. Originally intended to provide basic information about individual firms, and to link company and national accounts, this system, in practice has caused several difficulties. These are highlighted in Appendix II.

Architects, engineers, and all other professionals are subject to the non-commercial, professional activities tax. Income earned abroad by Egyptians practicing their profession is not taxed. Foreigners practicing on a temporary basis in Egypt are also exempt until they establish a permanent office. (These appear to be tax office

TABLE 5.1

Tax Collections as Reported by the Cairo Tax Office for Construction
Under the Ministry of Finance (LE 1000)

SOURCE: Reference (79)

| Year | Building Contractors | | Civil Contractors | |
|-------------------|----------------------|---------|-------------------|-------|
| | Number | Taxes | Number | Taxes |
| 1973 | 3,951 | 126.4 | 109 | 20.2 |
| 1974 ^a | 4,344 | 321.3 | 118 | 40.3 |
| 1975 ^b | 4,753 | 614.5 | 126 | 83.1 |
| 1976 ^b | 5,103 | 1,045.8 | 140 | 161.1 |
| 1977 ^b | 5,417 | 1,398.3 | 152 | 189.9 |

^aIncludes only 6 months of withholding.

^bIncludes withholding throughout the year.

decisions rather than specified in one of the tax laws.) Professionals are not taxed for their first three years of practice.

The tax rate is graduated and is as follows:

| <u>Taxable Income</u> | <u>Tax Rate</u> |
|--------------------------|-----------------|
| up to LE 1,500 per annum | 18 percent |
| LE 1,500-3,000 per annum | 20 percent |
| LE 3,000-5,000 per annum | 25 percent |
| over LE 5,000 per annum | 30 percent |

These figures represent a considerable reduction from those in force in tax Law 46 for 1978 (32 percent for the first LE 1,500 and up to 43 percent for net income above LE 5,000). Non-resident foreigners receiving income taxed under the provision of this tax are taxed at the flat rate of 20 percent. Living expenses, pension and life insurance up to 10 percent of net income, and another 10 percent for "professional depreciation" are permissible deductions. The law reverses previous tax laws in permitting realized losses to be carried over 5 years. Reserves for non-collected income can be deducted if the firm keeps its accounts and pays taxes on an accrued basis.

Professionals are required by law to keep two records: a daily cash ledger for income and expenses and a receipts book. Businesses failing to keep these records may be fined and their profits estimated by allowing only a 20 percent deduction from total income as general operating expenses and fixing the tax on the remaining sum. Law 78 of 1973 required all levels of government, public sector companies, syndicates, hospitals, newspapers, and private sector companies with capital exceeding LE 5,000 required to withhold 10 to 25 percent of each payment to professionals as income tax. Law 157 of 1981 empowered the

Minister of Finance to define the categories of professionals to whom this rule should apply.

The client sector of the construction industry is taxed as an owner of built-up property; the tax is levied on the property's annual rental value. The law permits the owner to pass real estate taxes on to the tenant. Allowing a 20 percent deduction from the rental value for expenses (maintenance), a tax of 10 to 40 percent, depending upon the monthly rental value per room, is levied on the remainder. Additional fees of 10 to 28 percent are added to this basic tax. Monthly room rents of under LE 8 are exempt from at least some of these taxes under Law 49 of 1977. Also exempt are public buildings and embassies. Agricultural land is also taxed according to its rental value.

Real estate taxation is complex, and dealt with in considerable detail in the MOHR/AID report on urban land use (27). The study concludes that part of the land speculation problem in Egypt in recent years can be attributed to the prevailing land taxation system. Property taxes are currently based on controlled rents, which are far below the market rental value of the land and buildings. The report recommends a penal tax on vacant land, which could become the basis for a future value tax.

Income from the sale of land has traditionally been taxed as realized income, but for individuals, the first transaction within a five year holding period has been exempt. Under Law 46 of 1978 and Law 157 of 1981, transactions repeated more than once in ten years are subject to a tax on profits from sale of land and buildings at the commercial tax rate, and any transaction inside an urban area is subject

to a flat tax equivalent to 5 percent of the gross transfer price of the land and building. Some transactions such as certain inheritance cases and contributions as a share in kind to corporations are exempt.

Participants in construction in Egypt are also subject to several other taxes as individuals: (a) tax on income from movable capital, (b) wage and salaries tax, and (c) general income tax. Tax on income from movable capital may be in the form of: (a) tax on movable values levied on corporate and government distributions of negotiable securities from shares, bonds, founder's shares and shares in limited partnerships, director's fees, redemption premiums paid to creditors, bond payments to bond holders, and redemptions on shares or capital invested prior to dissolution; and (b) tax on debts, deposits, and guarantees levied on proprietorships and partnerships, including interest on privileged mortgages, ordinary debts, and all cash deposits and guarantees due to Egyptians and foreigners residing in Egypt. A number of items such as holding companies' profits originating from smaller companies which have already paid taxes, shares of companies operating under Law 43 of 1974 for the first five years of operation, and deposits in banks and postal savings accounts are exempt from the tax. The tax is imposed at a rate of 32 percent, with no allowable deductions. Corporate and government agency taxes are withheld at the source and sent to the tax office, while those of proprietorships and partnerships are more difficult to monitor.

The wage and salary tax covers wages, salaries, indemnities, annuities, and allowances in kind paid to Egyptians and persons residing outside Egypt for services performed in Egypt, as well as to public sector and private sector managers. Daily paid laborers

are allowed no deductions, and pay nothing if their daily wage is below LE 4.0, or 2 percent if it is between LE 4.0 and 6.0.

Monthly paid workers are permitted to deduct pension and social security contributions (15 percent of wages), compulsory savings (1.5 percent for wages exceeding LE 30 per month), health insurance premiums (where applicable at the rate of 1.5 percent of wages) and an allowance for living expenses (LE 720 per year for single persons and LE 840 for married--Law 157 for 1981). The basic rates for monthly paid workers are graduated across six categories, beginning at 2 percent for an annual taxable income up to LE 480 and going up to 22 percent for an income over LE 3840. Law 157 (1981) repealed the defense and national security taxes. A flat 10 percent rate is levied on wages paid to foreign experts hired to work in Egypt for not more than six months.

Finally, all individuals residing in Egypt are subject to the general income tax on net income. Income exempt from any specific tax is also exempt from income tax. Foreign experts employed by the government and all foreign diplomatic personnel are exempt from paying the general tax. The general tax is levied on the total annual income subject to the other direct taxes, after certain additional deductions: interest on loans if not claimed under another tax, premiums for life annuities and alimony payment (up to 10 percent of income), all direct taxes paid during the year, losses from sale or closure of business, life insurance premiums (up to 15 percent of income or LE 2,000), and gifts to the state or charities not previously deducted. The general tax is graduated, ranging from zero to 50 percent, (Table 5.2). Law 151 of 1981 substantially reduced these rates; an annual taxable income of LE 10,000, for example, is now taxed at 15 rather than 30 percent.

TABLE 5.2

General Income Tax Rates Levied
On All Individuals in Egypt

Source: Reference (68)

| New Law of 1981 Taxable Income | Rate | Previous Law of 1978 Taxable Income | Rate |
|-----------------------------------|----------|----------------------------------------|----------|
| 0-2,000 | exempted | 0-1,200 | exempted |
| 2,000-3,000 | 8 | 1,200-2,000 | 8 |
| 3,000-4,000 | 9 | 2,000-3,000 | 9 |
| 4,000-5,000 | 10 | 3,400-4,000 | 10 |
| 5,000-6,000 | 11 | 4,000-5,000 | 11 |
| 6,000-7,000 | 12 | 5,000-6,000 | 12 |
| 7,000-8,000 | 13 | 6,000-7,000 | 15 |
| 8,000-9,000 | 14 | 7,000-8,000 | 20 |
| 9,000-10,000 | 15 | 8,000-9,000 | 25 |
| 10,000-20,000 | 18 | 9,000-10,000 | 30 |
| 20,000-25,000 | 20 | 10,000-15,000 | 35 |
| 25,000-30,000 | 22 | 15,000-20,000 | 40 |
| 30,000-35,000 | 24 | 20,000-30,000 | 45 |
| 35,000-40,000 | 26 | 30,000-49,000 | 50 |
| 40,000-45,000 | 28 | 40,000-50,000 | 55 |
| 45,000-50,000 | 30 | 50,000-60,000 | 60 |
| 50,000-60,000 | 32 | 60,000-70,000 | 65 |
| 60,000-65,000 | 37 | 70,000-100,000 | 70 |
| 65,000-70,000 | 42 | over 100,000 | 80 |
| 70,000-75,000 | 47 | | |
| over 75,000 | 50 | | |

In addition, the central planning of investment requires the participation of the cross-sectoral ministries, Planning, Finance, and Economy, in developing the investment plan. The Ministry of Planning is responsible for preparing the annual national budget for capital investment, the Ministry of Finance for preparing annual national budgets for operations and wages/salaries, the Ministry of Economy for overseeing foreign currency requirements, and other ministries such as Housing, Transportation, and Industry for preparing lists of projects and overseeing their implementation.

At the same time that central planning was introduced, a local administrative system was established under Law 124 of 1961, to decentralize government functions in order to promote local participation. The new Local Government Law of 1975 (Law 52) sought to redefine and clarify the roles of the executive authorities and citizen representatives in the execution of local affairs. Executive Committees and Local Councils were set up at the governorate, district, town, neighborhood, and village levels. Executive committees, consisting of the head of the locality, officials from various departments in the local administration, and ex-officio members of the local councils, are basically responsible for implementing national policies and administering government services and projects within the locality. Local councils of elected citizens have the authority to supervise certain government activities, such as health, education, housing, and transportation services and projects, review annual budgets, and administer municipal property. The Ministerial Committee for Local Government sets general policies and guidelines in accordance with national development plans and coordinates the activities of local

The government enacted these reductions to encourage compliance with tax laws. A recent article (14) claimed that only 31 percent of all taxpayers filed tax returns in 1980. The worst rate was, as expected, for those filing commercial and industrial taxes. However, it remains to be seen whether the new lower rates introduced by Law 157 of 1981 will increase compliance. Moreover, it is not clear that lowering the rates has significantly affected the taxpayers' tax burden. The equity of the system cannot be assessed easily because different participants are subject to different sets of taxes. For example, a small contractor in a proprietorship or a partnership must pay a maximum commercial tax of 30 percent (39.7 percent under the old law), plus a general income tax at the now lower graduated rates, while a professional organized in the same fashion earning a similar amount incurs a much lower professional tax (20 percent). This disparity was much wider under Law 46 of 1978.

5.3 ORGANIZATION OF THE GOVERNMENT

The extent of the role and influence of the government in construction has been discussed throughout this report. We shall here discuss only briefly how the government is organized as it affects construction. Figure 5.3 illustrates the rather complex interrelations, the flow of information, and the distribution of responsibilities among the various levels of government.

At the central or national level is the People's Assembly, the central legislative body, consisting of 350 members elected from 175 districts. Members serve five year terms, and at least half of them must be workers and farmers. The Assembly is divided into eighteen committees, of which one is the Committee on Housing, Construction, and

Building Materials. The Assembly approves the national budget after preparation by the Cabinet.

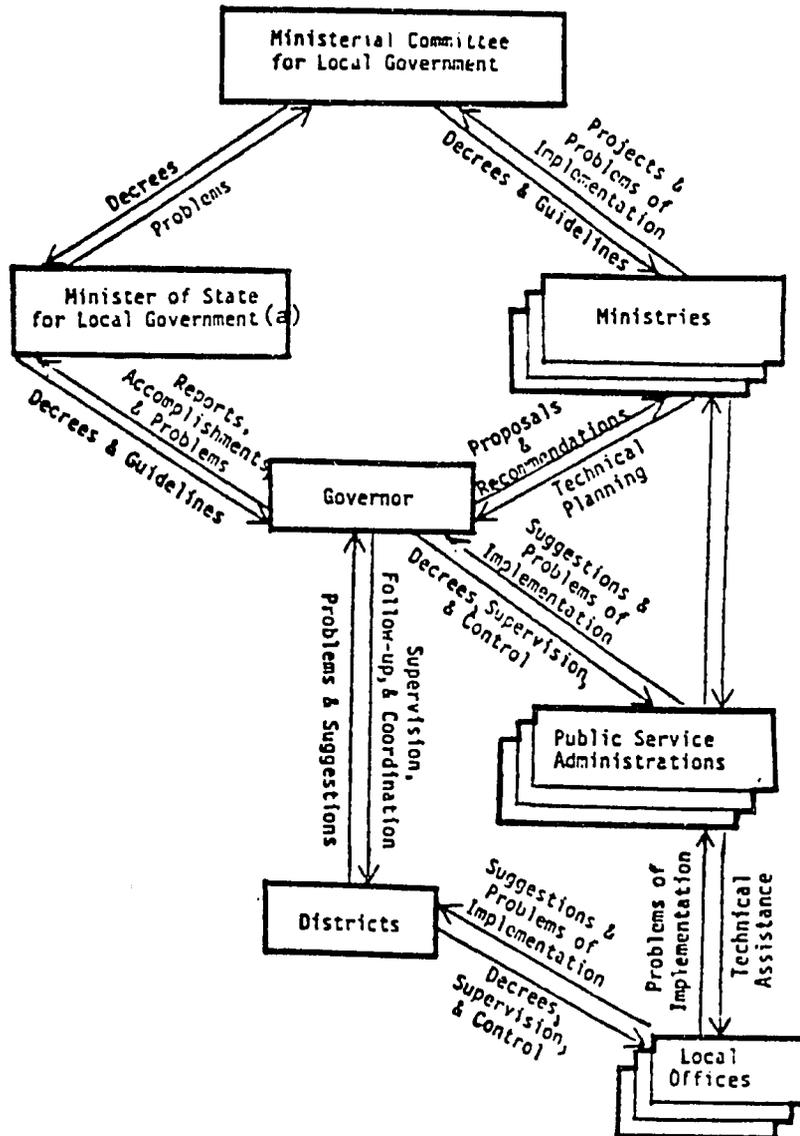
The Cabinet is the national policy-setting and budget-making body. It consists of over 30 ministers, headed by the Prime Minister, who serve under the President. Two Cabinet ministries are directly concerned with housing and construction: the Ministry of Development and New Communities, and the Ministry of State for Housing. The Ministry of Housing is concerned with all housing and administrative construction except that falling under the domain of the Ministry of Development and New Communities. The materials industry and contracting companies also fall under the Ministry of Housing's jurisdiction. Despite the demarcation of responsibilities, there exists considerable overlap. The Ministry of Housing's General Organization for Physical Planning necessarily interacts with planning units in other ministries which need constructed facilities, such as the Ministry of Transportation. The General Authorities for Drinking Water and for Sanitary Disposal, two subdivisions in the Ministry of Housing, and the Egyptian Railway Authority, a subdivision in the Ministry of Transportation, are all involved in operations. Each ministry is involved in budgets, and allocates funding for authorities and localities. Finally, ministries may become closely associated with project implementation. They may serve as an advisor to another agency, as did the Ministry of Development and New Communities in the case of the water and sewage projects for Cairo, Alexandria, and Helwan. They may also participate directly, as in the case of the new low cost sites and services project in Helwan, where the Ministry of Housing, together with the U.S. Agency for International Development, is the main client.

government units and the central ministries. There are still indications, however, that a fair amount of central government support, particularly technical assistance, is needed at the local level to compensate for a shortage of technical personnel and finances.

FIGURE 5.3

DIAGRAM SHOWING INTERRELATIONSHIPS BETWEEN
VARIOUS LEVELS OF GOVERNMENT

SOURCE: Reference (78)



(a) This post no longer exists in the government and the Governors are now members of the Council of Ministers.

CHAPTER VI

PROMOTION OF CONSTRUCTION IN EGYPT

Recent changes in Egypt have affected the nature of construction projects, resource markets, and established technologies. These changes have been reflected in price increases. Historically, the industry's problems have been aggravated by the continuous state of flux characterizing construction's organization and operations, as well as the government agencies which are involved with it. Traditionally, technical problems such as resource shortages and technological backwardness were the focus of attention. More recently, however, the managerial and organization aspects of the industry's problems have become more salient. Egypt must not permit the industry's increase in nominal output to be absorbed by price rises. Efforts should be directed toward raising both the capacity and the efficiency of the industry through better management, more stability and institution building.

The following recommendations are intended to form integral elements of a strategy to improve the operation of the industry, which can be effective only if the strategy is implemented in its entirety. Furthermore, improvements cannot be expected to produce instant results, but will hopefully contribute to a more capable and efficient construction industry in Egypt over time.

6.1 IMPROVE COORDINATION AND MANAGEMENT OF THE INDUSTRY

Construction is a complex process involving many participants and producing many facilities. Any effective strategy of change must consider the industry through this holistic view to be able to address the issues that arise from the interaction between the participants and the government for each type of construction. Such a view requires a considerable amount of interaction and coordination between the participants and the government. Constraints that inhibit clients, professionals, suppliers, financiers, and contractors should be identified to enhance understanding of the financial and regulatory needs of the industry.

- o A central, specialized body in the government should be designated to undertake this function. Whether such a body is newly created or spun off from an existing organization is not important. It should represent all participants and enjoy access to the highest levels of government. This body would be responsible for all programs required for the continuous development of the industry.

6.2 IMPROVE PLANNING AND PROGRAMMING FOR DEMAND

Planning for construction demand in Egypt is inadequate, despite the fact that the industry is explicitly included in the government's Five-Year Plans. Present efforts to plan construction are limited to listing projects and setting targets for construction's contribution to GDP and increased building materials production, without taking into account the limitations on the economy or the industry's capacity to expand. Better estimates of project resource requirements have to be made, which requires the development of reliable technical coefficients. Realistic

dates for completion of projects must be estimated based on the actual capacity of the contracting and materials subsections. Methods for making up shortfalls in existing capacity, such as foreign participation or project postponement, must be investigated.

- o Better planning requires timely and detailed data. The present system of handling and disseminating information about construction activities, projects, and firms has to be improved. Collection efforts have to be increased and diffusion to the public from various outlets has to be encouraged. This would not only enable the government to make better plans, but would also improve the operation of the firms in the industry by enabling them to plan their activities. The classification and qualification of contractors and professionals would constitute a first step in this direction.
- o These efforts require strengthening the body (construction units in the MOP) that currently prepares the construction plans. Not only are more qualified personnel required, but also better ties to industry participants should be forged. Very strong communication has to be established between this construction planning unit and the body recommended in 6.1.

6.3 IMPROVE PRESENT CONTRACTING CAPABILITIES

Given the investment goals of the Five-Year Plan and a return to competitive bidding for public government work, it is important to encourage private contractors to expand their operations and increase their investments in the contracting business. Joint ventures between local firms and multinationals should be encouraged. It is also

important to improve the efficiency of public sector firms.

- o A first step in encouraging private contractors would be to remove the discriminatory barriers imposed on the private sector, such as accessibility to materials, capital, and contracts. One means toward this goal would be to classify firms on the basis of their capabilities rather than capital ownership. Efforts to encourage small scale contractors by setting aside some work as well as resources for them may be justified and should prove beneficial, since most the private sector contractors fall into this category.
- o Foreign firms can play an important role in improving the efficiency of contracting in Egypt. First, both hard and soft technology can be transferred to Egyptian firms through joint ventures. Also, new construction methods and technologies can be introduced and adapted to the Egyptian situation. More importantly, such ventures can provide hands on training in construction management techniques that can be essential for the efficient use of the available resources. Joint ventures should be controlled to ensure that local participation takes the form of actual involvement in the work.
- o Several measures should be adopted to improve the efficiency of public sector contractors. More decision-making authority should be delegated to the heads of these companies, and more flexibility in employment policies should be allowed. Financial performance should figure very high, if not first, in evaluating the performance of these

firms each year. Actions should be taken toward eliminating the hidden subsidies granted to financially distressed public contractors. Finally, the practice of direct orders to public contractors should be abolished.

- o Administrative and technical assistance to the contractor sector for materials procurement, labor relations, and equipment purchase and rental might be organized through some form of contractor association. Such an organization currently does not exist in Egypt.

6.4 IMPROVE RESOURCE SUPPLY

6.4.1 Building Materials

Sporadic shortages in various materials that have caused prices to skyrocket have characterized building materials supply in Egypt. Several technical, managerial, and regulatory problems must be addressed to improve supply.

- o Subsidized materials should be decontrolled. The production of viable local materials, such as gypsum, should be encouraged, and their substitution for other materials in short supply, such as bricks, should be a goal of construction planning. To accomplish effective substitutions, the government might adopt new, locally available materials on its own projects, as well as using tax incentives.

6.4.2 Manpower

Problems in the supply of construction labor were aggravated in the 1970's by the extensive migration of skilled labor to neighboring Arab countries. This has caused labor costs to rise, construction quality to decline, and critically, productivity to fall.

- o To improve labor productivity, training efforts launched in the mid-1970's should be expanded. More funds should be directed to train more people in the specific construction skills in short supply in Egypt. Employment policies and wage controls should gradually be modified to allow firms to maintain their skilled workers. Finally, the scope of training programs should be enlarged to encompass supervisory and management personnel.

6.4.3 Equipment

Despite a considerable increase in the fleet of construction equipment as a result of the Open Door Policy in Egypt and the increased availability of foreign exchange, problems remain in equipment supply. The most serious of these is the stringency of bank lending requirements for equipment purchase, a problem which is exacerbated by the lack of rental facilities.

- o Efforts should be directed toward making equipment more accessible to smaller contractors. Equipment leasing and renting operations are a good vehicle to achieve this goal, especially where firms have access to foreign exchange, spare parts, and repair facilities. Credit for equipment purchase can also be made easier for private contractors. The creation of a classification system would facilitate the banks' judgment of contractor credit worthiness. Also, banks in theory should be willing to accept the purchased equipment as sufficient collateral for the loan.

6.4.4 Finance

Constraints on financing projects in Egypt arise from a widening gap between domestic savings and investment. These financial problems have in turn limited financing for contractors. Public sector firms have sizeable arrears due them from the government, which poses serious working capital problems to all firms. First, these contractors delay paying their subcontractors, whose financial situations suffer as a consequence. Secondly, they must borrow from the banking system, thus quickly exhausting the credit available for the industry and crowding out small firms. This situation has been exacerbated by requirements to pay in advance for materials. Finally, private sector contractors, especially smaller ones, long have encountered problems in securing bank loans, in part because of the difficulty in evaluating their credit worthiness and in part because of the competition they face from larger firms.

- o Action should be taken to increase local and foreign resources and to limit government expenditure to ensure sufficient funds are available for construction projects. Policies to encourage exports, restrict imports, and manage the foreign debt will ensure a steady flow of much needed foreign exchange. Similarly, public as well as private savings should be encouraged through higher interest rates and a broader financial market.
- o To alleviate contractors' financial problems, better firm management should be encouraged to generate more internal financing. Beyond this step, however, action is needed to solve the arrears problem, and payment for materials in

advance should be abolished. Access to the banking system should be made cheaper by setting up a contractor classification system. And finally, the banking system and the construction sector should explore the possibilities of establishing a special program for financing small scale contractors.

6.4.5 Government Commitment and Action

The laws and regulations governing construction, its planning, and the organization of the public sector, have been subject to revision for twenty years. This has contributed to industry inefficiency by making even more difficult coordinating efforts among the many government agencies which have a hand in supervising construction. Moreover, by favoring price controls over demand subsidies and the public over the private sector, the government has caused the private sector to hesitate in expanding operations, incurring risks, and stepping up investments in the contracting business.

- o To trim waste and eliminate inefficiency, laws and regulations that potentially constrain the industry's operations and its participants, such as price controls and the preferential treatment of the public sector, should be reviewed and revised.
- o As planner, the government should broaden its definition of the industry, and include all participants, processes, and resources, not merely the supply of building materials, financing of purchase, and labor. At the project level, it should improve the awarding of permits and licenses, financing procedures, and contract drafting, and clarify the

role and responsibilities of participants. In awarding government contracts, the government should review project size, timing, and financing, with an eye toward facilitating the participation of small contractors.

- o To advance the state of the industry in Egypt, the government should sponsor and conduct research on hardware and software technology, disseminate the findings, and promote the adoption of whatever new techniques and materials that research and development efforts produce. To encourage the use of new materials and techniques, the government should incorporate them into its own projects.

APPENDICES

APPENDIX I Balance Sheets of 29 Companies Under MOH

APPENDIX II The Unified Accounting System

APPENDIX III Construction Price Indices

APPENDIX I Balance Sheets of 29 Companies Under MOH

APPENDIX I (continued)
BALANCE SHEET OF 29 COMPANIES UNDER (MOE) ON DECEMBER 31, 1978

| COMPANY | REVENUES (IN L.A.M. WORKS) | OTHER REVENUES | WAGES | INPUTS (MATERIALS) | SERVICES | DEPRECIATION | EXPENSES (FINANCIAL WORKS) | TOTAL WORKS EXECUTED IN L.A.M. & OFF SHORE | % OF SHIP- CONTRACTS | WORKS BY SHIP-CON- TRACTORS | CONTRACTS AVAILABLE FOR NEXT YEAR | |
|------------------------------------------------------|----------------------------------|-------------------|--------|-----------------------|----------|--------------|----------------------------------|-----------------------------------------------------|-------------------------|-----------------------------------|--------------------------------------------|-------|
| 1-Arab Contractors | 284021 | 28656 | 43937 | 79158 | 82706 | 21243 | 10039 | 507217 | 21,5 | 66051 | 735519 | |
| 2-El Nasr General Contracting | 52702 | 439 | 7707 | 12222 | 20261 | 4320 | 3196 | 35891 | 34,1 | 19058 | 189356 | |
| 3-Nisar Concrete | 35547 | 1197 | 6809 | 11641 | 10578 | 3895 | 1669 | 67393 | 27,6 | 18600 | 121242 | |
| 4-Labro General Contracting Co. | 19287 | 391 | 3009 | 4880 | 8209 | 1234 | 1080 | 21535 | 28,2 | 6072 | 53898 | |
| 5-Atlas General Contracting | 13918 | 298 | 2429 | 3983 | 4706 | 696 | 453 | 13819 | 29,0 | 4007 | 43909 | |
| 6-Egyptian Contractors | 32672 | 2865 | 3541 | 7165 | 17090 | 2448 | 4311 | 31598 | 29,2 | 9226 | 95269 | |
| 7-Egyptian Contracting Co., Ltd. | 17571 | 495 | 2016 | 5062 | 6923 | 1553 | 1409 | 18939 | 31,6 | 5984 | 55301 | |
| 8-Nile General Company for Reinforced Concrete | 13033 | 65 | 4068 | 3091 | 3313 | 937 | 570 | 11041 | 22,7 | 2960 | 56218 | |
| 9-Gomhouriah General Contractors | 19087 | 280 | 2060 | 4246 | 10751 | 818 | 507 | 19086 | 32,2 | 9962 | 50967 | |
| 10-El Nasr for Building & Const. | 16163 | 401 | 1881 | 2394 | 8566 | 1460 | 678 | 16011 | 38,2 | 6116 | 74151 | |
| 11-Arabian Contracting | 9661 | 1438 | 3760 | 7206 | 3770 | 1161 | 239 | 26545 | 18,9 | 5017 | 104433 | |
| 12-The General Co. for Const. | 11269 | 1263 | 1649 | 3684 | 4087 | 536 | 581 | 11001 | 33,6 | 3696 | 32848 | |
| 13-Niiza General for Contracting | 8008 | 424 | 1401 | 2961 | 2751 | 545 | 100 | 8006 | 30,3 | 2425 | 25193 | |
| 14-Engineering & Indust. Project Contractors | 12301 | 53 | 2907 | 2993 | 3 | 3477 | 972 | 310 | 12287 | 19,5 | 2395 | 25000 |
| 15-Nile General for Bridges | 8479 | 358 | 1312 | 2171 | 4058 | 754 | 60 | 8683 | 41,5 | 3603 | 38609 | |
| 16-Nile General for Contracting | 11642 | 165 | 1092 | 2886 | 3723 | 730 | 423 | 14338 | 41,0 | 5879 | 26456 | |
| 17-Ipper Egypt for General Contr. | 8108 | 182 | 958 | 2309 | 3679 | 475 | 194 | 8108 | 42,0 | 3405 | 28324 | |
| 18-Mahmoudiah for Contracting | 9725 | 54 | 769 | 2303 | 4951 | 363 | 254 | 9732 | 47,5 | 4622 | 50749 | |
| 19-El Nasr for Civil Works | 10951 | 358 | 1106 | 1742 | 6429 | 659 | 347 | 11479 | 52,3 | 6003 | 32246 | |
| 20-Arab Co. for Foundations | 5974 | 1311 | 1403 | 2762 | 936 | 614 | 313 | 3792 | 5,0 | 290 | 9092 | |
| 21-Delta General for Contracting | 8676 | 449 | 1212 | 1987 | 3545 | 370 | 90 | 8675 | 45,5 | 3947 | 23199 | |
| 22-Hed Sen Gen. for Contracting | 5098 | 201 | 615 | 1146 | 2636 | 212 | 102 | 5098 | 33,6 | 1712 | 16651 | |
| 23-Egyptian General for Building | 2657 | 369 | 444 | 606 | 1119 | 119 | 62 | 2631 | 74,0 | 631 | 8054 | |
| 24-Nasr Installation and Utilities Contractors | 2605 | 686 | 664 | 1702 | 428 | 90 | 93 | 2648 | 58,8 | 1557 | 29064 | |
| 25-New Valley for Contracting | 3780 | 28 | 719 | 2145 | 2192 | 246 | 150 | 3761 | 35,8 | 2062 | 7925 | |
| 26-Alex. General for Contracting | 5098 | 31 | 661 | 1875 | 2266 | 177 | 11071 | 4804 | 38,7 | 1859 | 15978 | |
| 27-Canal General for Contracting | 3473 | 434 | 658 | 987 | 1377 | 168 | 116 | 4200 | 34,7 | 1457 | 10763 | |
| 28-General Contr. for Sanitary Works | 3747 | 87 | 356 | 373 | 1023 | 18 | 77 | 3746 | 56,4 | 2112 | 2805 | |
| 29-General for Foundation Corp. | 1464 | 40 | 494 | 604 | 297 | 68 | 131 | 1463 | 10,3 | 151 | 2532 | |
| | 639497 | 43018 | 101637 | 170644 | 274790 | 48480 | 27158 | 219527 | 27,05 | 200856 | 1948410 | |

APPENDIX I (continued)
BALANCE SHEET OF 29 COMPANIES UNDER (MUNT) ON DECEMBER 31, 1978

| COMPANY | SCRAP | DOCUMENTARY CREDITS | WORK IN PROGRESS | MERCHANDISE HELD BY OTHERS | FINISHED PRODUCTS | FINANCIAL INVESTMENT | DEBITORS (CLIENTS) | OTHER DEBITORS | CASH | DEFICIT |
|--------------------------------------------------|-------|---------------------|------------------|----------------------------|-------------------|----------------------|--------------------|----------------|-------|---------|
| 1 - Arab Contractors | | 3638 | 55198 | 8 | | 29003 | 145903 | 18039 | 10406 | |
| 2 - El Nasr General Contracting | | 69 | | | | 648 | 57126 | 1607 | 4315 | |
| 3 - Misr Concrete | 263 | 125 | 9853 | 22 | 369 | 690 | 19851 | 4783 | 2210 | |
| 4 - Cairo General Contracting Co. | | 4471 | | | 57 | 792 | 19351 | 904 | 2680 | |
| 5 - Atlas General Contracting | 19 | 10 | 522 | 12 | 232 | 462 | 15039 | 4551 | 1806 | |
| 6 - Egyptian Contractors | 86 | 183 | 5360 | | | 1779 | 22926 | 4962 | 11263 | |
| 7 - Egyptian Contracting Co., Ltd. | 61 | | 6672 | | | 42 | 12287 | 916 | 659 | |
| 8 - Nile General Company for Reinforced Concrete | 77 | | | | 15 | 24 | 10604 | 862 | 1487 | |
| 9 - Gnehourieh General Contractors | | | 104 | 38 | 15 | 179 | 21159 | 1261 | 75 | |
| 10 - El Nasr for Building & Const. | 70 | 18 | 145 | | | 136 | 14742 | 2664 | 847 | |
| 11 - Arabian Contracting | | 366 | 73 | | | 54 | 16956 | 365 | 3030 | |
| 12 - The General Co. for Const. | 171 | | 3727 | | 161 | 150 | 10042 | 7975 | 1429 | |
| 13 - Giza General for Contracting | | 56 | | | | 370 | 8340 | 2968 | 1544 | |
| 14 - Engineering & Indust. Project Contractors | 49 | | | | | 257 | 10879 | 835 | 798 | |
| 15 - Nile General for Bridges | 86 | 11 | 4970 | | | 101 | 7540 | 2524 | 38 | |
| 16 - Nile General for Contracting | 30 | 87 | 4154 | | | 155 | 12850 | 865 | 1185 | |
| 17 - Upper Egypt for General Contr. | 41 | 78 | 71 | 25 | | | 4844 | 814 | 287 | 543 |
| 18 - Mahmoudiah for Contracting | 1 | 608 | 58 | | | 19 | 6186 | 1617 | 47 | |
| 19 - El Nasr for Civil Works | | 45 | 4049 | | | 523 | 5908 | 1446 | 883 | |
| 20 - Arab Co. for Foundations | 9 | 37 | 193 | | | 76 | 3719 | 111 | 673 | |
| 21 - Delta General for Contracting | | | | | | 21 | 11254 | 47 | 35 | |
| 22 - Red Sea Gen. for Contracting | 16 | | 86 | | | | 6329 | 359 | 531 | |
| 23 - Egyptian General for Building | 7 | | 20 | | 177 | | 2690 | 528 | 527 | |
| 24 - Nasr Installation and Utilities Contractors | | | 244 | 15 | | 7 | 1655 | 526 | 100 | 1554 |
| 25 - New Valley for Contracting | | | 43 | | 51 | 21 | 4726 | 216 | 42 | |
| 26 - Alex. General for Contracting | | | | | | 1 | 2663 | 695 | 695 | 750 |
| 27 - Canal General for Contracting | 18 | | | | | | 5517 | 90 | 34 | |
| 28 - General Contr. for Sanitary Works | 15 | 12 | 7 | 123 | 51 | 9 | 1632 | 155 | 58 | 102 |
| 29 - General for Foundation Contr. | | | 131 | | | | | 862 | 136 | 927 |
| | 1019 | 9814 | 95630 | 243 | 1115 | 36179 | 463788 | 252657 | 47206 | 3816 |

ATTACHEMENT I

BALANCE SHEET OF 29 COMPANIES UNDER (MOR) ON DECEMBER 31, 1978
Source: Reference (22)

Values in LE 1000

| COMPANY | LAND | BUILDING | EQUIPMENT | TRANSMISSION | TOOLS | FURNITURES | DEFERRED EXPENDITURE | ASSETS UNDER EXECUTION | MATERIALS | FUEL | SPARE PARTS |
|--------------------------------------------------|------|----------|-----------|--------------|-------|------------|----------------------|------------------------|-----------|------|-------------|
| 1 - Arab Contractors | 5385 | 11039 | 71135 | 32697 | 15681 | 4162 | | 23687 | 70883 | | |
| 2 - El Nasr General Contractors | 387 | 900 | 13066 | 5479 | 6476 | 579 | | 3103 | 5607 | | 1707 |
| 3 - Misr Concrete | 369 | 485 | 11314 | 4784 | 4516 | 339 | 10 | 1786 | 5287 | | 2081 |
| 4 - Cairo General Contracting Co. | 134 | 115 | 2982 | 2176 | 3798 | 177 | | 63 | 5037 | 3 | 240 |
| 5 - Atlas General Contracting | 93 | 134 | 1077 | 1145 | 2971 | 153 | | 731 | 2848 | | 113 |
| 6 - Egyptian Contractors | 83 | 309 | 5266 | 3974 | 4063 | 324 | | 670 | 7763 | | 1148 |
| 7 - Egyptian Contracting Co., Ltd. | 109 | 95 | 3884 | 1715 | 2697 | 164 | 33 | 255 | 2872 | | 283 |
| 8 - Nile General Company for Reinforced Concrete | 39 | 284 | 991 | 1868 | 5719 | 107 | | 201 | 2766 | | 328 |
| 9 - Gomhouriah General Contractors | 14 | 115 | 1021 | 1192 | 2214 | 72 | | 2862 | 2037 | | |
| 10 - El Nasr for Building & Construction | 491 | 4547 | 1825 | 2681 | 41 | 91 | 29 | 4381 | 1520 | | 535 |
| 11 - Arabian Contracting | 204 | 192 | 2790 | 2838 | 2175 | 154 | | 60 | 3030 | | |
| 12 - The General Company for Construction | 54 | 210 | 799 | 1234 | 1161 | 109 | 4 | 107 | 2586 | | 98 |
| 13 - Giza General for Contracting | | 1355 | 5419 | 1021 | 33 | 31 | 273 | 169 | 1656 | | 40 |
| 14 - Engineering & Indust. Project Contractors | 52 | 141 | 1887 | 877 | 1575 | 190 | | 24 | 3383 | 1 | 186 |
| 15 - Nile General for Bridges | 29 | 145 | 1916 | 1167 | 1335 | 91 | 7 | 765 | 2061 | 3 | 194 |
| 16 - Nile General for Contracting | 38 | 41 | 1382 | 1209 | 2609 | 78 | | 56 | 1350 | | 96 |
| 17 - Upper Egypt for General Construction | 105 | 3668 | 1199 | 43 | 52 | 192 | | 823 | 974 | 6 | 267 |
| 18 - Mahmoudia for Contracting | 14 | 33 | 261 | 710 | 1509 | 60 | | 82 | 1244 | | 37 |
| 19 - El Nasr for Civil Works | 30 | 118 | 1625 | 878 | 140 | | 95 | 1593 | | | |
| 20 - Arab Co. for Foundations | 48 | 16 | 4922 | 350 | 200 | 91 | | 13 | 671 | | 340 |
| 21 - Delta General for Contracting | 100 | | 486 | 755 | 1318 | 59 | | | 1330 | | 96 |
| 22 - Red Sea Gen. for Contracting | 8 | 31 | 342 | 656 | 725 | 38 | | | 637 | | 64 |
| 23 - Egyptian General for Building | | 8 | 126 | 384 | 342 | 54 | | 158 | 294 | | 47 |
| 24 - Nasr Installation and Utilities Contractors | 1 | 6 | 143 | 367 | 254 | 30 | | 350 | 443 | | 109 |
| 25 - New Valley for Contracting | | 33 | 195 | 723 | 762 | 36 | | 1 | 812 | 3 | 36 |
| 26 - Alex. General for Contracting | | 20 | 856 | 442 | 21 | 33 | | 91 | 914 | | |
| 27 - Canal General for Contracting | 9 | 11 | 193 | 231 | 272 | 27 | | 65 | 670 | | 19 |
| 28 - General Cont. for Sanitary Works | | 2 | 126 | 50 | 24 | 27 | | 13 | 672 | | 3 |
| 29 - General for Foundation Contr. | | | 418 | 127 | 31 | 18 | | 7 | 61 | | |
| | 5796 | 23653 | 137846 | 71271 | 61511 | 7606 | 356 | 40590 | 130431 | 16 | 8086 |

APPENDIX II
THE UNIFIED ACCOUNTING SYSTEM*

The Unified Accounting System has established the forms and the rules for preparing company statements. Figure AII.1, a typical balance sheet of accounts for a public sector contractor, shows normal accounts such as fixed assets (#11), inventory (#13), financial investments (#15), accounts receivable (#16), and cash (#18), as well as special accounts. Investments in fixed assets are registered separately in account #12. The debit side of the various payables (#26 and #27) is added to the assets side and the cost of work being forwarded to the next fiscal year is included in account #132 under "unfinished products and work underway at cost." The firm's activities, however, are not fully evident in the balance sheet. For instance, the value of the work at sale price is not shown independently, but is lumped into account #273, "other accounts receivable," making it impossible to calculate the value of work executed from the balance sheet.

The income statement for these companies is presented in three different accounts. The Current Activities Account (Figure AII.2) permits calculation of the gross margin account (current income (#41) minus current expenses (#31, #32, #33, and #35)) as well as the value of net profits for distribution (gross margin plus other incomes (#44) minus indirect expenses (#36)). The other two accounts, the Production

* This appendix is largely based on information from References 9 and 57 except where otherwise noted.

FIGURE AII.1
TYPICAL BALANCE SHEET
ACCOUNTS FOR PUBLIC SECTOR CONTRACTOR
Source: Reference (9)

| <u>ASSETS</u> | | <u>LIABILITIES</u> | |
|---------------|------------------------------------------------|--------------------|----------------------------------------------|
| 11 | <u>Fixed Assets</u> | 21 | <u>Capital</u> |
| 111 | Land | | Nominal Capital |
| 112 | Buildings | | Paid in Capital |
| 113 | Equipment & Machines | 22 | <u>Reserves and Retained Earnings</u> |
| 114 | Transport Equipment | 221 | Legal Reserve |
| 115 | Tools | 222 | Reserve for Investments in Government Bonds |
| 116 | Furniture & Office Equipment | 223 | General Reserve |
| 12 | <u>Projects Underway (for company use)</u> | 226 | Reserve Against Increase in Asset Prices |
| 121 | Goods Formation (Buildings Under Construction) | 228 | Retained Earnings from Operations |
| 122 | Capital Expenditure (to Acquire Fixed Assets) | 23 | <u>Allocations</u> |
| 13 | <u>Inventory</u> | 231 | Depreciation |
| 131 | Goods Raw Materials, Spare Parts | 2310 | Buildings |
| 132 | Unfinished Goods (at Cost) | 2313 | Equipment & Machines |
| 134 | Goods to be Delivered | 2314 | Transport Equipment |
| 15 | <u>Financial Investments</u> | 2315 | Tools |
| 151 | Basically Government Bonds | 2316 | Furniture & Office Equipment |
| 16 | <u>Receivables</u> | 232 | Taxes |
| 161 | From Clients | 233 | Bad Debts |
| | Payment Due | 234 | Allocation Other Than Depreciation |
| | Performance Guarantees | | To Finish Work Underway |
| 163 | From Other Debtors | | For Delay Penalties |
| | Various Insurance With Others | | For Litigation |
| 17 | <u>Other Receivables</u> | 24 | <u>Long-Term Loans</u> |
| | All Other Accounts Receivable | | From Local Bank for Purchase of Fixed Assets |
| 18 | <u>Cash On Hand & In Banks</u> | 18 | <u>Short-Term Loans</u> |
| 181 | On Hand | 182 | From Banks |
| 182 | In Banks | | |

FIGURE AII.1 (continued)

| <u>A S S E T S</u> | | <u>L I A B I L I T I E S</u> | |
|--------------------|----------------------------------------------|------------------------------|-----------------------------------------------------|
| 26 | <u>Accounts Payable</u> (debit side) | 26 | <u>Accounts Payable</u> |
| 261 | Suppliers | 261 | Suppliers |
| | Subcontractors | | Subcontractors |
| 264 | Distribution Creditors | 263 | Varied Creditors |
| | Workers Profits | | Insurance |
| 27 | <u>Various Accounts Payable</u> (debit side) | | Tax Department |
| 272 | Asset Purchase Creditors | | Ministry of Finance |
| 273 | All Other Payables | | General Organization For Social Security |
| 2731 | Employees Deductions | 264 | Distribution Creditors |
| | | | Local Services |
| | | | Employees Profit Sharing |
| | | 27 | <u>Various Accounts Payable</u> |
| | | 272 | Asset Purchase Creditors |
| | | 273 | All Other Accounts Payable (Value of Executed Work) |
| | | 274 | Current Special Expenses |
| | | 16 | <u>Receivables</u> (credit side) |
| | | 161 | Clients |
| | | | Advance Payments |
| | | | Payments on Activities |
| | | 26 | <u>Payables</u> (other) |
| | | 263 | Varied Accounts Payable for Tax Purposes |

FIGURE A11.2

CURRENT ACTIVITIES ACCOUNT

Source: Reference (9)

| | | | |
|-----|--------------------------------------|-----|---------------------------------------|
| 31 | <u>Wages</u> | 41 | <u>Income From Current Activities</u> |
| 311 | Cash Wages | 411 | Work Executed in Sites |
| 312 | Fringe Benefits | | Production of Workshop |
| 313 | Social Securities | | For Others |
| | General Expenses | 414 | Changes in Unfinished Goods |
| 32 | <u>Used Goods Requirements</u> | | Inventory |
| 33 | <u>Used Services Requirements</u> | 415 | Internally Manufactured Goods |
| 35 | <u>Current Transfer Expenses</u> | 419 | Scrap and Debris Sold |
| 351 | Taxes and Fees | * | GROSS MARGIN ACCOUNT |
| 352 | Depreciation | 44 | <u>Transferred Incomes</u> |
| | Buildings | 441 | Interest on Investments |
| | Equipment | 444 | Income from Previous Years |
| | Transport | 445 | Compensations |
| | Tools | 446 | Varied Incomes |
| | Furniture | 443 | Capital Gains |
| 353 | Actual Rents | 448 | Different Interest |
| 354 | Local Interest | | |
| 357 | Different Interests | | |
| 36 | <u>Current and Special Transfers</u> | | * Gross Margin Account: Value = |
| 361 | Donation | | Account #41 - (Accounts 31 + |
| 363 | Compensations/Fines | | 32 + 33 + 35) |
| 364 | Capital Losses | | |
| 365 | Past Year's Expenses | | |
| 366 | Other Allocations Besides | | |
| | Depreciation | | |
| | For Finishing Current | | |
| | Projects | | |
| | For Bad Debts | | |
| | For Changes in Spare | | |
| | Parts Prices | | |
| | For Changes in Raw | | |
| | Materials Prices | | |
| | For Delay Fines | | |
| 369 | Internal Taxes for Year's | | |
| | Activities | | |

FIGURE AII.2 (continued)

** Distribute Profits Accounts
Value = Gross Margin Account
+ #44 - #36

Nasser Social Bank's Share (almost 3%)

Reserves and Retained Earnings

5% Legal Reserve

5% Reserve for Government Bonds

5% Reserve for Asset Price Increase

Retained Earnings to Capital

and Trade Statement (Figure AII.3) and the Profit and Loss Account (Figure AII.4) include basically the same information as the Current Activities Account. The Production and Trade Statement calculates the gross margin from the project by deducting the costs of production (#53) and the costs of production services (#63) from current income (#41). The Profit and Loss Account calculates the net profit for distribution by subtracting from the gross margin the costs of administration and finance (#83). Net profits of public sector firms are distributed according to government-set rules: three percent are channeled to the Nasser Social Bank, a government-specialized bank charging no interest on its loans; 15 percent are retained as reserves; and the remaining 83 percent is divided between paying employees' end-of-year bonuses (25 percent) and to increasing the paid-in capital of the firms (75 percent). Private corporations, are required only to set aside 5 percent of their profits as legal reserves. These reserves, are tax deductible for both private and public corporations.

Contracting differs from other businesses in that most public contractor projects extend over a period of several fiscal years. In addition, the financial status of each project may not be evident until it approaches completion, as early profits may be offset by later losses and vice-versa. Because of these peculiarities, the system has allowed contractors to calculate profits only on work more than 50 percent complete stage and to create two types of temporary reserves for costs incurred in finishing these projects. The first type of reserve is for completed projects. In those cases, 5 percent of project profits may be retained against any future claims that may arise during the guarantee

FIGURE AII.3
 PRODUCTION AND TRADE ACCOUNT
 Source: Reference (9)

| <u>Costs of Production</u> | | <u>Current Income</u> | |
|----------------------------|-------------------------------------|-----------------------|------------------------------------------------|
| 531 | Wages | 41 | Production at Selling Price |
| 532 | Required Goods | 411 | Work Executed in Sites |
| 533 | Required Services | | Production of Workshops |
| 535 | Current Transfer Expenses | 414 | Changes in Unfinished Goods Inventory |
| 536 | Current & Special Transfers | 415 | Internally Finished Products |
| | <u>Costs of Production Services</u> | 419 | Scrap & Debris |
| 631 | Wages | | |
| 632 | Required Goods | | |
| 633 | Required Services | | |
| 635 | Current Transfer Expenses | | |
| 636 | Current & Special Transfer | | |
| | | ** | Total Margin (Value = Account #41 - #53 - #63) |
| | | | Value transferred to profit and loss statement |

period. These are deducted from the second half of the Current Activities Statement, usually under account #367, and any costs incurred on these projects fall under account #365, "previous year expense". When the guarantee period ends, the 5 percent is added to the Current Activity Statement under account #444, "income from previous years." The second reserve, created for projects more than 50 percent complete, retains a portion of the project's profit equal to the percentage remaining to be completed. However, because the Unified Accounting System does not have a special account for this allocation, it is also lumped into account #367 of the Current Activities Statement.

Further complicating construction accounting is the requirement that all costs figure in the statement. But in order to calculate margins, only those costs relevant to work on which profits have been calculated are counted. For this reason the system has created account #414, "changes in unfinished goods inventory." This account is debited at the beginning of the period with the value of work carried over, then credited at the end of the period with total costs of work forwarded; the balance which is shown in the final statement is either added to or subtracted from the current activity income (#411). This procedure does not show the differences between the cost of work carried over from the previous year and that forwarded to the following year in relation to the total cost of work being carried out during the year. Finally, account #411 does not show the value of work on which profits are calculated; in order to determine this value, the system has created an intermediate account, "change in finished product inventory at cost," similar to account #414. Since most final accounts do not show that

intermediate account, the Current Activities Statement does not distinguish the value of work executed during the current year from that carried over from previous years and that forwarded to the following one.

These complications have made the task of evaluating a firm's performance somewhat difficult, as they do not permit direct comparisons between the cost and value of work executed and that carried over versus that forwarded in a given fiscal year. Such comparisons were made more easily under the old accounting customs in contracting, which relied on a balance sheet to present such information and where current assets included the costs of a piece of work and current liabilities included the value of the same work, the portion carried over from previous years, that executed during the current year - generating profit, and that forwarded to the following year.

These issues are even further complicated by requirements of the system such as inventory valuation and the depreciation of fixed assets. The system requires that goods inventories be valued on the basis of a floating price calculated as follows:

$$\text{item cost} = \frac{\text{value of previous stock} + \text{added value of goods}}{\text{quantity of balance} + \text{added quantity}}$$

Such a system, especially in contracting, where the quantities and types of goods in inventory are very large and the warehouses numerous and widely distributed, requires a rather large amount of clerical work. The depreciation rules set by the system require that all assets be depreciated on the basis of a constant balance depreciation method. These should be calculated quarterly and each quarter's share allocated depending on the use of the asset. The system also indicated the

economic life of the components comprising the assets, depending on the use of the asset itself. However, up to 1977 no special depreciation ratio was set for every contracting activity, since the uses of equipment are expected to differ from one type of construction to the other. Also quarterly allocation of the depreciation of fixed assets requires, besides keeping track of the hourly use of each asset individually, vastly increased bookkeeping effort, which may not sometimes be justifiable. The system, in trying to take into consideration price inflation of fixed assets, has required that firms set up allocations to offset these price increases; such allocations are usually financed from the net profits of the firm (see Figure AII.2) and from the capital gains realized on sales of fixed assets that are added to the reserves. Capital losses, on the other hand, are deducted from net profits in account #364 in the Current Activities Statement.

Such requirements are mandated on public sector firms while tax regulations allow private firms to use a simpler and sometimes more advantageous system in reporting their financial position. The tax office accepts inventory valuations based on fixed price valuation either on a first-in-first-out or last-in-first-out method. Such methods, which require only that inventory be valued at the fixed price of either the first or last item stocked, make recording procedures less cumbersome. The tax-office also allows firms to use declining balance depreciation methods, which tend to lower the reported income of firms in the early years of the assets' economic life, thus reducing taxes during that period. The fact that the Unified Accounting System does not allow such a possibility imposes an extra burden on public firms and may even contribute to the in high administration costs.

FIGURE AII.4
 PROFIT AND LOSS ACCOUNT
 Source: Reference (9)

| | | | |
|------|----------------------------------------------|------|--------------------------------|
| 83 | <u>Costs of Administration & Finance</u> | *** | Total Margin |
| 831 | Wages | 44 | Transferred Income |
| 832 | Refinished Materials | 441 | Interest on Investment |
| 833 | Required Services | 444 | Income from Previous Year |
| 835 | Current Transfer Expenses | 445 | Compensation/Fines |
| 836 | Current & Special Transfers | 446 | Varied Incomes |
| | Donations | 443 | Capital Gains |
| | Compansation/Fines | | |
| | Capital Losses | | |
| | Past Year Expenses | | |
| | Other Allocations Besides | | |
| | Depreciation | | |
| | Bad Debt | | |
| | Finish Current Projects | | |
| | Price Differential on | | |
| | Spare Parts | | |
| | Price Differential on | | |
| | Inventories | | |
| | Taxes | | |
| | Delay Fines | | |
| **** | Net Profit Distribution | **** | Net Profits to be Distributed. |
| | 3% Nasser Social Bank's Share | | (Value = Account *** + |
| | 5% Legal Reserve | | Account #44 - Account #831) |
| | 5% Reserve for Government Bonds | | |
| | 5% Reserve Against Price | | |
| | Escalation | | |
| | 82% Retained Earnings | | |

APPENDIX III

CONSTRUCTION PRICE INDICES

Construction price indices in Egypt are either based on the prices of building material inputs and hence do not reflect real increases in construction prices, or apply only to residential building construction which represents a small portion of the industry's output. An attempt is made here to construct price indices for the four categories of construction - residential, industrial, other building, and non-building based on the prices of various inputs -- materials, labor and capital.

Building materials and capital costs:

Because prices for the main building materials are regulated by the government, the official wholesale building materials price index reflects changes only in these official prices. It is proposed that an alternative index developed by the Ministry of Housing based on the black market prices of these building materials be used, despite the fact that such prices also reflect speculation by suppliers and actual scarcities. Capital costs are very difficult to ascertain in Egypt due to the subsidies built into the foreign exchange rate and the interest rate on government projects. The wholesale price index tends to underestimate the increases in capital costs in Egyptian construction. But since capital is the smallest component of costs in Egypt and due to the lack of a more realistic index, the wholesale price index is used to reflect changes in capital

costs. These two indices are shown in Table AIII.1 for the years 1960 through 1980.

Labor Cost Index:

Construction labor migration together with sustained high demand for construction have caused, labor wages to increase considerably since 1960 (Table AIII.2). While the increase in wages was fairly uniform, the increase in labor costs varied according to the numbers and skill levels of workers required by each type of construction. These labor requirements are displayed in Table AIII.3 for the construction of LE 1,000,000 worth of residential, industrial, other building, and non-building facilities. The figures exclude excavation work, which in non-building construction is assumed to be performed partially by equipment (bulldozers and shovel loaders). Such an assumption has validity, based on the experience of public sector contractors on large projects. Using these numbers as weights for the labor cost changes derived from wage data provided in Table AIII.2, we arrive at possible labor costs indices for the four categories of construction (Table AIII.4).

Construction Costs

Table AIII.5 shows the distribution of contractor costs in Egypt in the early 1970's among materials, labor, and capital depreciation in the construction of the four types of facilities. Using the average breakdown from this table as a weight, together with the price indices for material, capital and labor calculated in Tables AIII.1 and AIII.4, we arrive at price indices for residential, industrial, other building, and non-building construction (Table AIII.6).

TABLE AIII.1

Price Indices for Material and Capital

(Source: Ref. 4, 28)

| Year | Capital Cost Index ^(a) | Building Material Cost Index ^(b) |
|------|-----------------------------------|---------------------------------------------|
| 1960 | 100.0 | 100.0 |
| 1961 | 100.8 | 103.5 |
| 1962 | 100.8 | 107.0 |
| 1963 | 100.9 | 115.2 |
| 1964 | 104.7 | 125.8 |
| 1965 | 112.5 | 129.4 |
| 1966 | 171.6 | 142.6 |
| 1967 | 127.6 | 156.3 |
| 1968 | 130.0 | 159.4 |
| 1969 | 132.4 | 162.5 |
| 1970 | 136.6 | 168.4 |
| 1971 | 139.7 | 173.6 |
| 1972 | 141.0 | 184.3 |
| 1973 | 150.8 | 282.6 |
| 1974 | 172.3 | 287.6 |
| 1975 | 185.8 | 292.6* |
| 1976 | 199.9 | 297.7* |
| 1977 | 214.0* | 302.9* |
| 1978 | 229.1* | 308.1* |
| 1979 | 245.2* | 313.5* |
| 1980 | 262.5* | 319.0 |

(a) Source: Ref. 4

(b) Source: Ref. 28

*Estimated based on extending previous trend.

Table AIII.2
Average Daily Money Wage in LE for Various Construction Works
(Source: Refs. 11,28)

| | 1960 ^a | 1962 ^a | 1965 ^a | 1970 ^b | 1973 ^b | 1975 ^b | 1977 ^b | % Change 60-70 | % Change 70-77 |
|-----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|----------------------|----------------------|
| Mason | 0.80 | 0.80 | 0.90 | 1.50 | 2.50 | 3.50 | 5.70 | 87.5 | 280 |
| Assistant M. | 0.60 | 0.60 | 0.70 | 1.00 | 2.00 | 3.00 | 5.70 | 67.0 | 470 |
| Low-skill M. | 0.40 | 0.40 | 0.50 | 0.60 | 1.50 | 2.00 | 3.00 | 50.0 | 400 |
| Excavation | 0.20 | 0.20 | 0.25 | 0.30 | 0.60 | 1.00 | 1.50 | 50.0 | 480 |
| Concrete Carpenter | 0.70 | 0.70 | 0.80 | 0.90 | 11.25 | 2.00 | 3.25 | 29.0 | 260 |
| Assistant CC | 0.40 | 0.40 | 0.50 | 0.60 | 0.80 | 1.50 | 2.25 | 50.0 | 275 |
| Steel Fixer | 0.50 | 0.50 | 0.55 | 0.70 | 1.00 | 2.00 | 3.00 | 40.0 | 329 |
| Assistant | 0.50 | 0.50 | 0.55 | 0.60 | 0.90 | 1.50 | 2.50 | 20.0 | 317 |
| Concrete Pourer | 0.40 | 0.40 | 0.50 | 0.60 | 0.90 | 2.00 | 3.00 | 50.0 | 400 |
| Concrete Carrier | 0.30 | 0.30 | 0.40 | 0.50 | 0.80 | 1.75 | 2.75 | 67.0 | 450 |
| Plumber | 0.70 | 0.70 | 0.75 | 0.80 | 1.50 | 4.00 | 5.00 | 15.0 | 520 |
| Assistant | 0.35 | 0.35 | 0.40 | 0.50 | 0.90 | 2.00 | 2.50 | 43.0 | 400 |
| Plasterer | 0.60 | 0.60 | 0.70 | 0.75 | 0.90 | 2.00 | 3.00 | 25.0 | 300 |
| Assistant | 0.30 | 0.30 | 0.40 | 0.50 | 0.60 | 1.00 | 1.90 | 67.0 | 280 |
| Painter | 0.70 | 0.70 | 0.75 | 0.80 | 1.00 | 2.00 | 3.00 | 15.0 | 275 |
| Assistant | 0.35 | 0.35 | 0.40 | 0.50 | 0.70 | 1.25 | 1.50 | 43.0 | 200 |
| Joiner | 0.60 | 0.60 | 0.70 | 0.80 | 1.25 | 2.00 | 3.50 | 33.0 | 335 |
| Assistant | 0.35 | 0.35 | 0.40 | 0.50 | 0.80 | 1.25 | 2.00 | 43.0 | 300 |
| Electrician | 0.30 | 0.30 | 0.40 | 0.75 | 1.00 | 2.00 | 32.0 | 150.0 | 325 |
| Assistant | 0.20 | 0.20 | 0.35 | 0.50 | 0.75 | 1.50 | 1.70 | 150.0 | 240 |

(a) values are 70% of those in Ref. 20 to account for social security
(b) values are from Ref. 11.

TABLE AIII.3
Type of Workers Required
to Build 1,000,000 LE of Differing Facility Types

(Source: Ref 59)

| Type of Worker and Level of Skill | Residential | | Industrial | | Other Building | | Non-building | |
|-----------------------------------------|-------------|--------|------------|--------|----------------|--------|--------------|--------|
| | Weight | Number | Weight | Number | Weight | Number | Weight | Number |
| Masonry | .140 | 73 | .066 | 24 | .114 | 56 | .240 | 43 |
| High | | 15 | | 5 | | 11 | | 9 |
| Medium | | 22 | | 7 | | 17 | | 13 |
| Low | | 36 | | 12 | | 28 | | 21 |
| Steel Fixing | .061 | 32 | .071 | 26 | .065 | 32 | .118 | 21 |
| High | | 14 | | 12 | | 14 | | 9 |
| Medium & Low | | 18 | | 14 | | 18 | | 12 |
| Carpentry | .111 | 58 | .137 | 50 | .022 | 60 | .202 | 36 |
| High | | 26 | | 23 | | 27 | | 16 |
| Medium & Low | | 32 | | 27 | | 33 | | 20 |
| Concrete Pouring | .198 | 104 | .145 | 53 | .225 | 110 | .438 | 78 |
| High | | 26 | | 13 | | 28 | | 20 |
| Medium & Low | | 78 | | 40 | | 32 | | 58 |
| Sanitary Works | .140 | 72 | .096 | 35 | .059 | 29 | - | - |
| High | | 22 | | 11 | | 9 | | - |
| Medium & Low | | 51 | | 24 | | 20 | | - |
| Plastering | .182 | 95 | .181 | 66 | .155 | 76 | - | - |
| High | | 33 | | 23 | | 27 | | - |
| Medium & Low | | 62 | | 43 | | 49 | | - |
| Painting | .027 | 15 | .077 | 28 | .088 | 43 | - | - |
| High | | 5 | | 10 | | 15 | | - |
| Medium & Low | | 9 | | 18 | | 28 | | - |
| Joinery | .126 | 66 | .123 | 45 | .129 | 63 | - | - |
| High | | 30 | | 20 | | 28 | | - |
| Medium & Low | | 36 | | 25 | | 35 | | - |
| Electrical Works | .015 | 8 | .104 | 38 | .045 | 21 | - | - |
| High | | 2 | | 11 | | 6 | | - |
| Medium & Low | | 6 | | 27 | | 15 | | - |
| Subtotal | | 523 | | 365 | | 490 | | 178 |
| TOTAL | 1.000 | 680 | 1.000 | 485 | 1.000 | 652 | 1.000 | 396 |

Table AIII.4
Labor Cost Indices for Major Types of Construction
 (Calculated from Tables AII.2 and AIII.3)

| Year | Residential | | Industrial | | Other Building | | Non-Building | | A* | Index B* |
|-------------------|---------------------|--------|---------------------|--------|---------------------|--------|---------------------|--------|----|----------|
| | Labor Cost in LE | Index | | |
| 1960 | 30.57 | 1.00 | 18.05 | 1.000 | 26.75 | 1.000 | 667.45 | 1.000 | | 1.000 |
| 1961 | | 1.000 | | 1.000 | | 1.000 | | 1.000 | | 1.000 |
| 1962 | 30.57 | 1.000 | 18.05 | 1.000 | 26.75 | 1.000 | 558.45 | 1.000 | | 1.000 |
| 1963 | | 1.071 | | 1.073 | | 1.075 | | 1.083 | | 1.081 |
| 1964 | | 1.142 | | 1.145 | | 1.149 | | 1.167 | | 1.162 |
| 1965 | 37.08 | 1.213 | 21.99 | 1.218 | 32.73 | 1.223 | 834.30 | 1.250 | | 1.242 |
| 1966 | | 1.275 | | 1.270 | | 1.277 | | 1.300 | | 1.307 |
| 1967 | | 1.338 | | 1.323 | | 1.330 | | 1.350 | | 1.372 |
| 1968 | | 1.400 | | 1.375 | | 1.384 | | 1.400 | | 1.437 |
| 1969 | | 1.463 | | 1.428 | | 1.437 | | 1.450 | | 1.502 |
| 1970 | 46.61 | 1.525 | 26.71 | 1.480 | 39.86 | 1.490 | 1001.25 | 1.500 | | 1.567 |
| 1971 | | 1.830 | | 1.707 | | 1.792 | | 1.999 | | 1.914 |
| 1972 | | 2.136 | | 1,935 | | 2.093 | | 2.499 | | 2.261 |
| 1973 | 74.62 | 2.341 | 39.02 | 2.162 | 64.06 | 2.395 | 2001.96 | 2.999 | | 2.607 |
| 1974 | | 3.455 | | 3.120 | | 3.379 | | 3.999 | | 3.087 |
| 1975 | 136.58 | 4.468 | 73.59 | 4.077 | 116.72 | 4.363 | 3335.75 | 4.998 | | 3.567 |
| 1976 | | 5.697 | | 5.197 | | 5.585 | | 6.245 | | 5.612 |
| 1977 | 211.69 | 6.925 | 113.38 | 6.281 | 182.11 | 6.807 | 5006.05 | 7.500 | | 7.667 |
| 1978 ^a | | 8.418 | | 7.591 | | 8.296 | | 9.007 | | 10.475 |
| 1979 | | 10.232 | | 9.175 | | 10.11 | | 10.817 | | 14.310 |
| 1980 | | 12.438 | | 11.088 | | 12.324 | | 12.991 | | 19.550 |

* Index A based on construction technology that uses labor for earthwork; Index B based on a construction technology that uses earthmoving equipment instead of labor for earthwork.

Note: Figures for the years 1960, 1962, 1970, 1973, 1975 and 1977 are from Table AIII.2. For the other years the increase in the index was assumed to be linear.

Table AIII.5

Distribution of Costs by Public versus
Private Contractors for Various Facilities
(Sources: Ref. 7, 8)

| | | Residential | Industrial | Other Building | Non- Building |
|--------------------------------------|---------|-------------|------------|-------------------|------------------|
| Percent Material Costs | Public | 72 | 65 | 68 | 57 |
| | Average | 71 | 65 | 67 | 56 |
| | Private | 68 | 63 | 65 | 53 |
| Percent Labor Costs | Public | 23 | 27 | 24 | 24 |
| | Average | 23 | 27 | 24 | 30 |
| | Private | 23 | 27 | 25 | 35 |
| Percent Depreciation and Rents | Public | 5 | 8 | 9 | 13 |
| | Average | 6 | 8 | 9 | 14 |
| | Private | 9 | 10 | 10 | 12 |
| TOTAL | Public | 100 | 100 | 100 | 100 |
| | Private | 100 | 100 | 100 | 100 |

Table AIII.6
Construction Price Indices for Differing Facility Types
 (Based on Tables AIII.1, AIII.4, AIII.5)

| Year | Residential ¹ | Industrial ² | Other Building ³ | Non-Building ⁴ |
|------|--------------------------|-------------------------|-----------------------------|---------------------------|
| 1960 | 100 | 100 | 100 | 100 |
| 1961 | 103 | 102 | 102 | 102 |
| 1962 | 105 | 105 | 105 | 104 |
| 1963 | 112 | 111 | 112 | 111 |
| 1964 | 121 | 120 | 121 | 119 |
| 1965 | 126 | 125 | 126 | 126 |
| 1966 | 137 | 136 | 137 | 135 |
| 1967 | 149 | 147 | 147 | 146 |
| 1968 | 153 | 150 | 151 | 150 |
| 1969 | 156 | 153 | 154 | 153 |
| 1970 | 162 | 159 | 160 | 159 |
| 1971 | 172 | 167 | 170 | 171 |
| 1972 | 185 | 179 | 183 | 186 |
| 1973 | 260 | 247 | 254 | 251 |
| 1974 | 286 | 293 | 281 | 270 |
| 1975 | 311 | 297 | 308 | 287 |
| 1976 | 341 | 325 | 357 | 344 |
| 1977 | 370 | 352 | 390 | 401 |
| 1978 | 403 | 381 | 426 | 467 |
| 1979 | 440 | 413 | 465 | 545 |
| 1980 | 479 | 447 | 509 | 635 |

Note: The price indices were calculated from the individual input indices using the consumption of these inputs by the facilities shown in Table 2-6 as weights as follows:

- (1) 0.70 x material cost index + 0.23 x labor cost index + 0.07 x capital cost index
- (2) 0.65 x material cost index + 0.26 x labor cost index + 0.09 x capital cost index
- (3) 0.67 x material cost index + 0.25 x labor cost index + 0.08 x capital cost index
- (4) 0.55 x material cost index + 0.30 x labor cost index + 0.15 x capital cost index

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