JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

GENERAL ORGANIZATION FOR INDUSTRIALIZATION
THE ARAB REPUBLIC OF EGYPT

FINAL REPORT
FOR
THE FEASIBILITY STUDY
ON
INSTALLATION OF STEEL FLAT PRODUCTS COMPLEX
IN
THE ARAB REPUBLIC OF EGYPT
(PHASE-2)

DECEMBER,1997

NKK CORPORATION
IN ASSOCIATION WITH
KOBE STEEL,LTD.

JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

GENERAL ORGANIZATION FOR INDUSTRIALIZATION
THE ARAB REPUBLIC OF EGYPT

FINAL REPORT

FOR
THE FEASIBILITY STUDY
ON
INSTALLATION OF STEEL FLAT PRODUCTS COMPLEX
IN
THE ARAB REPUBLIC OF EGYPT

(PHASE-2)

DECEMBER, 1997

NKK CORPORATION
IN ASSOCIATION WITH
KOBE STEEL, LTD.

PREFACE

In response to a request from the Govemment of the Arab Republic of Egypt, the government of Japan decided to conduct a development study on Feasibility Study on Installation of Steel Flat Products Complex (Phase2), and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Egypt a study team headed by Mr. Nobuhisa Otani, NKK Coporation, three times between March 1997 and September 1997.

The team held discussions with the officials concerned of the Government of Egypt and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Egypt in order to descuss a draft report and the present report was perpared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Egypt for their close cooperation extended to the team.

December 1997

Kimio Fujita
President
Japan International Cooperation Agency

December, 1997

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmission

Dear Mr. K. Fujita:

We are pleased to submit to you the final report for the feasibility study on Installation of Steel Flat Products Complex in the Arab Republic of Egypt (Phase-2)

The purpose of the study is to select the most appropriate plant site among the candidates Egyptian counterpart proposed and to establish facility and operation plan, and to verify the construction of steel flat products complex In Egypt through environmental assesment and financial analysis based on the forcast of the flat product market in Egypt assuming that the plant will be put into operation in 2005.

The report consists of the following thirteen chapters.

As the result of the feasibility study, it is concluded that, although the total amount of investment will reach US$ 1.1 billion, the materlalization of a steel flat products complex in Egypt will be quite beneficial and feasible in terms of capital investment.

Constrution and operation of a flat product plant will require great amount of construciton matcrials, raw materials, utilities, spare parts, and maintenance of the equipment. It will generate employment opportunities among not only the company itself, but also subsidiary companies and supporting Industries.
Furthermore, domestic industries will be encouraged to improve their productivity by the supply of high quality flat products with reasonable delivery time. In consequence, their international competitiveness will be strengthened in both domestic and overseas market.

The production of flat products will conserve the out flow of foreign currency from Egypt. If a decrease in import is equal to the sales amount of the plant, US$ 200 to 300 million will be saved annually.

Therefore materialization of the project will have quite beneficial effects of promoting expanded employment opportunities and development of surrounding industries in Egypt as well as improvement of international balance of foreign currency.

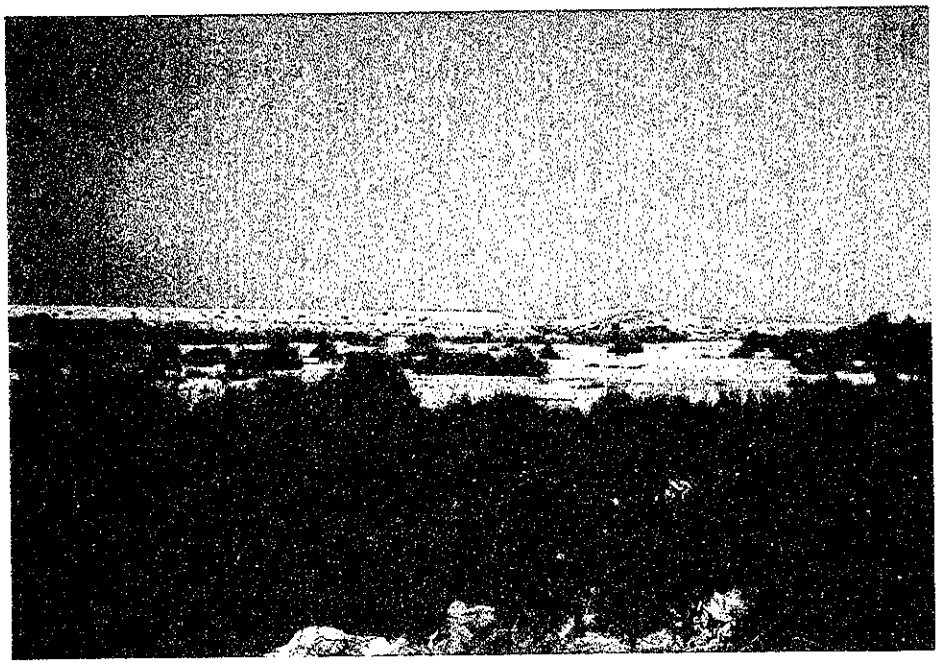
Consequently, the Study Team concluded that construction of steel flat products complex in Egypt is feasible and it will contribute to the development of the Egyptian economy as a whole.

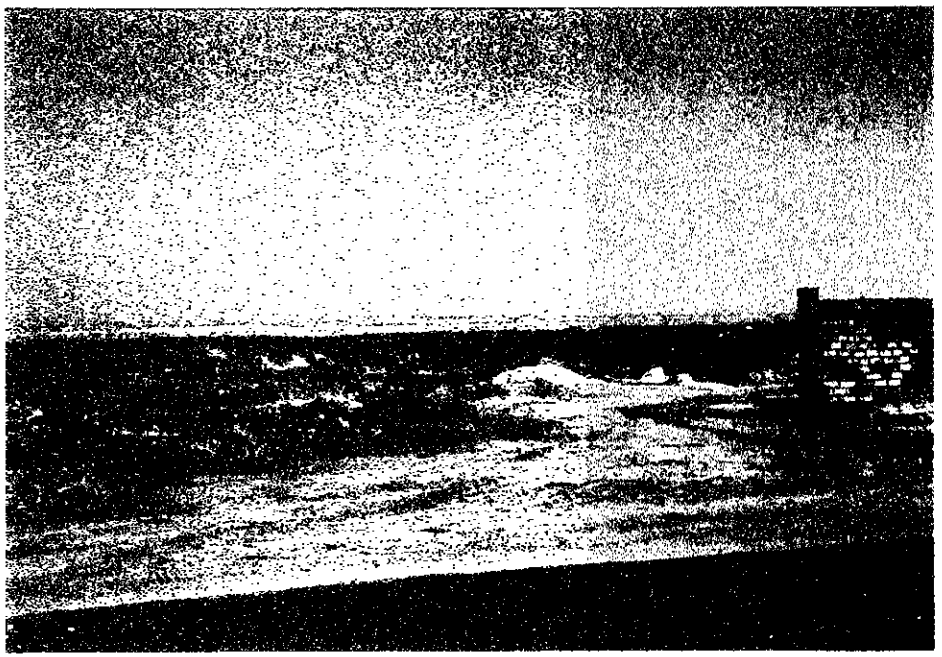
We wish to take this opportunity to express our sincere gratitude to the Ministry of Foreign Affairs, the Ministry of International Trade and Industry of Japan, and your Agency in the Arab Republic of Egypt, for valuable advice and support extended to the study. We also wish to express our deep appreciation to GOFI and relevant authorities in the Arab Republic of Egypt for close cooperation and assistance extended to the study.

Sincerely yours,

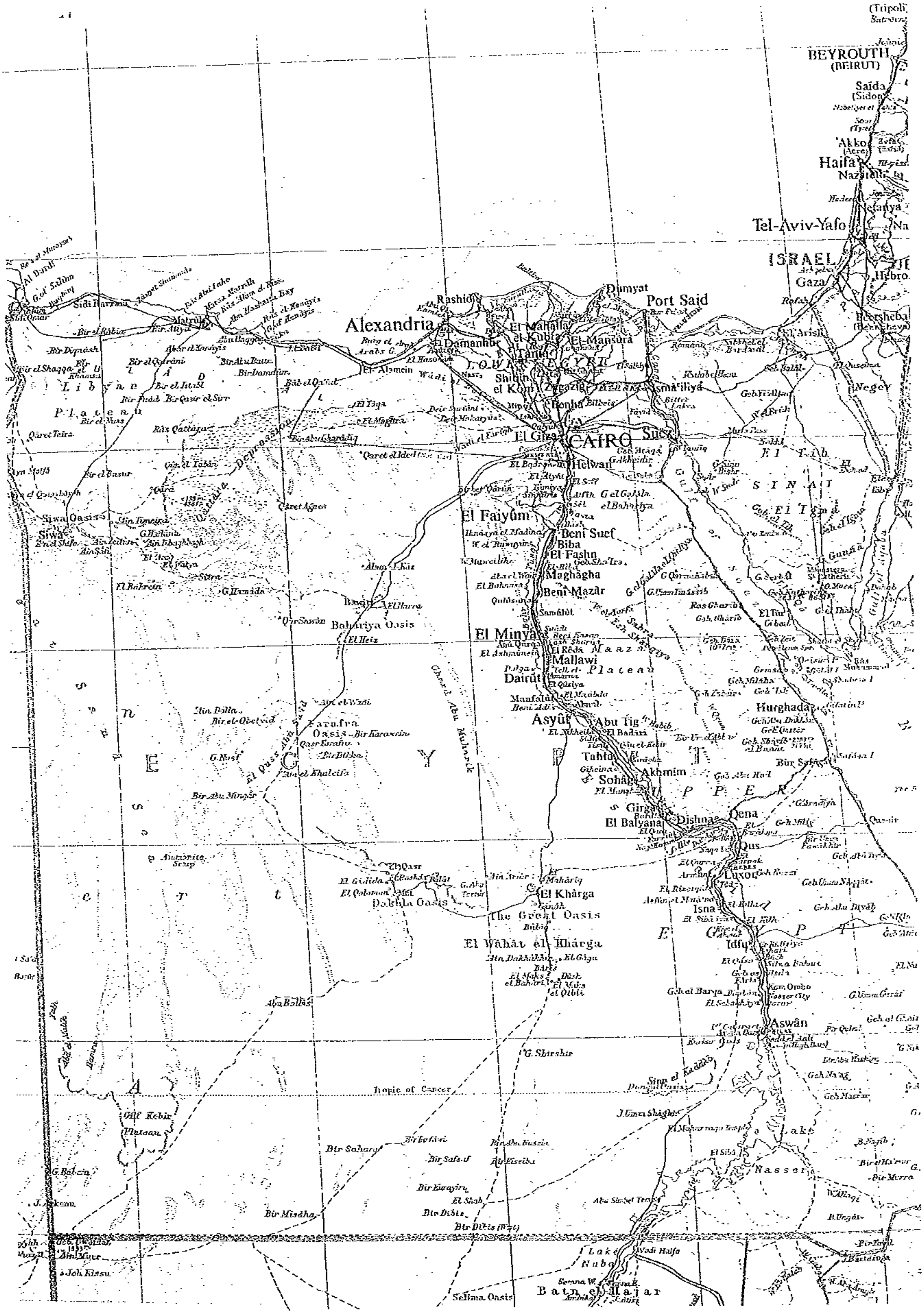
Nobuhisa Otani
Team Leader
The Feasibility Study on Installation of Steel Flat Products Complex in the Arab Republic of Egypt

Photographs of the Site





Map of Egypt



BEYROUTH
(BEIRUT)
Saïda
(Sidon)
'Akko
(Acre)
Haifa
Tel-Aviv-Yafo
ISRAEL
Gaza
Rafah
El 'Arish
Negev
Dumyat
Port Said
Rashid
Alexandria
Damanhur
El Mahalla el Kubra
El Mansura
Tanta
Shibin el Kom
Zagazig
Isma'iliya
Benha
LOWER EGYPT
El Alamein
Matruh
Sidi Barrani
Sallum
Libyan Plateau
Qattara Depression
CAIRO
El Giza
Suez
Helwan
Gulf of Suez
SINAI
Siwa Oasis
Siwa
El Faiyûm
Beni Suef
Biba
El Fashn
Maghagha
Beni Mazar
Bahariya Oasis
El Minya
Mallawi
Dairût
Manfalût
Asyût
Abu Tig
Tahta
Sohâg
Akhmim
Girga
El Balyana
Dishna
Qena
Qus
Luxor
Isna
Idfu
Aswân
Hurghada
Farafra Oasis
Dakhla Oasis
El Khârga
The Great Oasis
El Wâhât el-Khârga
EGYPT
UPPER EGYPT
Tropic of Cancer
Gilf Kebir Plateau
Lake Nasser
Lake Nubia
Wadi Halfa
Batn el Hajar
Selima Oasis

CONTENTS

Chapter 6. FACILITY PLAN

Chapter 7. IMPLEMENTATION PLAN

Chapter 8. ENVIRONMENTAL ASSESSMENT

Chapter 11. ESTIMATION OF PRODUCTION COST

Chapter 12. FINANCIAL ANALYSIS

Chapter 13. CONCLUSION AND RECOMMENDATION

LIST OF TABLES

Chapter 1. GENERAL

Chapter 2. STEEL PRODUCTION IN EGYPT

Chapter 3. FLAT PRODUCT MARKET IN EGYPT

Chapter 4. PLANT SITE SELECTION

Chapter 5. BASIC FLAT PRODUCT PLANT CONCEPT

Chapter 6. FACILITY PLAN

Chapter 7. IMPLEMENTATION PLAN

Chapter 8. EMVIRONMENT ASSESMENT

Chapter 9. CORPORATIVE IMPREMENTATION PLAN

Chapter 10. ESTIMATION OF CAPITAL INVESTMENT COST

Chapter 11. ESTIMATION OF PRODUCT COST

Chapter 12. FINANCIAL ANALYSIS

LIST OF FIGURES

Chapter 1. GENERAL

Chapter 2. STEEL PRODUCTION IN EGYPT

Chapter 3. FLAT PRODCT MARKET IN EGYPT

Chapter 4. PLANT SITE SELECTION

Chapter 5. BASIC FLAT PRODUCT PLANT CONCEPT

Chapter 6. FACILITY PLAN

Chapter 7. IMPREMENTATION PLAN

Chapter 8. ENVIRONMENT ASSESSMENT

Chapter 9. CORPORATIVE IMPLEMENTATION PLAN

Chapter 10. ESTIMATION OF CAPITAL INVESTMENT COST

Chapter 11. ESTIMATION OF PRODUCTION COST

Chapter 12. FINANCIAL ANALYSIS

Appendices

Chapter 1. GENERAL

Appendix 1A-1 List of Attendance
Appendix 1A-2 Field Survey Schedule
Appendix 1A-3 List of Persons Whom the Mission Met during the Site Survey

Chapter 2. STEEL PRODUCTION IN EGYPT

Appendix 2A-1 Investigation on Steel Works in Egypt

Chapter 3. FLAT PRODUCT MARKET IN EGYPT

Appendix 3A-1 Flat Product Consuming Companies
Appendix 3A-2 Information of Consumers
Appendix 3A-3 Reference Unit Price for Civil and Building Works

Chapter 4. PLANT SITE SELECTION

Appendix 4A-1 Meteorological Conditions
Appendix 4A-2 Availability of Typical Construction Materials
Appendix 4A-3 Availability of Typical Construction Man Power
Appendix 4A-4 Availability of Typical Construction Equipment
Appendix 4A-5 Typical Contractors for Civil and Building Work
Appendix 4A-6 Comparison of Plant Site (Suez and Alexandria)
Appendix 4A-7 Information and Data of Safaga

Chapter 5. BASIC FLAT PRODUCT PLANT CONCEPT

Chapter 6. FACILITY PLAN

Appendix 6A-1 Direct Reduction Plant
Appendix 6A-2 Steelmaking Plant
Appendix 6A-3 Hot Strip Mill Plant
Appendix 6A-4 Cold Strip Mill Plant
Appendix 6A-5 Lime Calcining Plant
Appendix 6A-6 Power and Distribution Facilities
Appendix 6A-7 Utilities Facilities
Appendix 6A-8 In-works Transportation Facilities
Appendix 6A-9 Analysis and Inspection Facilities
Appendix 6A-10 Maintenance Shop

LIST OF ABBRIVATIONS

AD	Administration Facilities
AGC	Automatic Gage Control
AI	Analysis and Inspection Facilities
ANSDK	Alexandria National Iron and Steel Co.
BAF	Single Stack Annealing Furnaces
BD	Board of Directors
BF	Blast Furnace
BOF	Basic Oxygen Furnace
CAL	Continuos Annealing Line
CAPMAS	Central Agency for Public Mobilization and Statistics
CC	Continuos Casting
CCM	Continuous Casting Machine
CCP	Continuos Casting Plant
CGL	Continous Hot Dip Galvanizing Line
CMD	Chairman & Managing Director
CPL	Continuous Pickling Process
CRM	Cold Reverse Mill
CSM	Cold Strip Mill
CSMP	Cold Strip Mill Plant
CVP	Conventional Slab CCM & HSM Process
DCF	Discounted Cash Flow Method
DCW	Direct Cooling Water
DFF	Direct Fired Furnace
DGM	Deputy General Manager
DR	Direct Reduction

DRI	Direct Reduced Iron
DRP	Direct Reduction Plant
DWT	Dead Weight Ton
EAF	Electric Arc Furnace
ECP	Egyptian Code and Practice
EEA	Egyptian Electric Agency
EGPC	Egyptian General Petroleum Corporation
EGSMA	Egyptian Geological Survey and Mining Authority
EISCO	Egyptian Iron and Steel Co.
ENR	Egyptian National Railways
F.Z.	Free Zone
FES	Fume Extraction System
FPC	Flicker and Power Factor Compensator
FSB	Finishing Scale Breaker
GAFI	General Authority for Investment
GASCO	Egyptian Natural Gas Company
GIS	Gas Insulated Swirchgear
GM	General Manager
GOFI	General Organization for Industrialization
GPT	Ground Potential Transformer
H.H.F	High Harmonic Filters
HBI	Hot Briquetted Iron
HCR	Hot Charged Rolling
HSB	Hydraulic Scale Breaker
HSM	Hot Strip Mill
HSMP	Hot Strip Mill Plant
ICW	Indirect Cooling Water

IISI	International Iron and Steel Institute
IMC	Industrial Mining Complex
IRR	Internal Rate of Return
JICA	Japan International Cooperation Agency
JMD	Joint Managing Director
LA	Lightning Arrester
LCP	Lime Calcining Plant
LE	Egyptian Pounds
LF	Ladle Furnace
LTWD	Sea Water Depth in Low Tide
MOF	Metering Outfit
MOFI	Ministry of Finance and Taxation Authority
MS	Maintenance Shop
MSP	Medium Slab CCM & HSM Process
NGR	Neutral Grounding Resistor
NOF	Non Oxygen Furnace
NOPWASD	National Organization for Potable Water and Sanitary Drainage
OES	Optical Emission Spectro Meter
OHF	Open Hearth Furnace
OJT	On-the-job Training
ONAF	Oil Natural Air Force
ONAN	Oil Natural Air Natural
OSY	Open Scrap Yard
PFL	Plate Finishing Line
PIW	Pounds per inch width
PPL	Push Pull Pickling Line
PW	Power and Distribution Facilities

RCL	Recoiling Line
RCM	Cold Reversing Mill
RHF	Radiant Hearth Furnace
RMP	Rolling Mill Plant
RT	Radiant Tube
S.F.C.	Static Flicker Compensator
SA	Surge Absorber
SAW	Sub-merged Arc Welding
SCC	Slab Continous Casting
SKL	Skinpass Line
SL-CCM	Slab Continous Casting Machine
SMP	Steel Making Plant
SPH	Scrap Pre-heating
SS	Suspended Solid
TCM	Cold Tandem Mill
TDS	Total Disolved Solid
TFS	Tin Free Steel
TIN	Tinplate
TM	Temper Mill
TR	In-works Transportation Facilities
TSP	Thin Slab CCM & HSM Process
UAS	Uniflow Annealing System
UBC	Uniform Building Code
UT	Utilities Facilities

Chapter 1

GENERAL

Chapter 1. GENERAL

1-1 Background and Purpose of the Study

The Arab Republic of Egypt has been implementing several economic development plans in recent years. The third five-year economic development plan ended at the end of June, 1997, and the subsequent fourth five-year plan has just started. These development plans have been carried out principally with the aims of promoting privatization, orientation to build market economy and expanding employment opportunities. As a result, domestic industries are expected to sustain this expansion process. Egypt's efforts toward on economic evolution have received strong support from the IMF and the World Bank.

Under such circumstances, the Egyptian Government puts a high priority on the revitalization of domestic mining and manufacturing industries. The Egyptian steel industry is expected to be promoted as a core industry.

With respect to the Egyptian steel industry, the Japan International Cooperation Agency (JICA) has so far carried out a total of five development studies, and among them, the studies on the El Dekhiela Steel Plant are well known as a success story of international cooperation.

The studies of the El Dekhiela Steel Plant had been implemented in three stages, which started in 1979 as a feasibility study. Then, expansion studies in 1986 followed, and aftercare study in 1991 was carried out. The steel plant, which was inaugurated exactly as JICA proposed, has mainly been producing products for reinforcing bars for the construction industry and has been successfully operated since the start-up. Through this experience, JICA's contribution to the Egyptian steel industry has been highly respected in Egypt.

It is expected that with the progress of economic growth in Egypt, such industries as automobile, electric appliance and construction industries will grow and as a result, demand for high quality flat products will expand. However, flat products are only produced by one company with an annual production capacity of approximately 560,000 metric tons. In terms of quality, however, it is reported that their products are not necessarily satisfying even the requirements of the domestic market.

In this connection, in January 1995, the Egyptian Government requested the Government of Japan to implement a feasibility study on construction of a steel flat

products complex (hereinafter referred to as flat product plant) in Egypt. In reply to that request, JICA dispatched a study team to Egypt in December 1995 and exchanged a scope of work (S/W) agreement between the GENERAL ORGANIZATION FOR INDUSTRIALIZATION (hereinafter referred to as GOFI), in which the process and scope of the study was defined.

It was confirmed in the said S/W agreement that the feasibility study would be implemented in accordance with the following two phases.

- Phase-1 Surveys on the demand for flat products:

  The purpose of Phase-1 was to verify whether the construction of a flat product plant would be feasible in terms of the supply and demand situations for flat products in Egypt by taking account of Egyptian industrial policies and the supply and demand situation in surrounding countries.

- Phase-2 Establishment of a construction plan for a flat product plant:

  The purposes of Phase-2 are the basic design of the flat product plant to establish the implementation plan for the complex and to make financial and economical analyses based on the supply and demand forecast from the Phase-1.

The result of Phase-1, which started in March 1996, shows that there will be enough demand for flat products to make the construction of the flat product plant feasible by the year of 2005.
Consequently, JICA decided at the end of 1996 to conduct the Phase-2 study, including decisions on concept of the facility plan, operating management plan, and financial and economical analyses of the new flat product plant.

As a preface of the feasibility study, it is assumed that the flat product plant shall be put into operation in 2005. The study shall cover both management and operation including an expansion plan for the plant up to 2015.

1-2 The Study Team Member

The Study Team was organized by NKK Corporation in association with Kobe Steel, Ltd., and its members, including supporting members from other companies, are as follows;

Name	Assignment	Company
Mr. Nobuhisa OTANI	Team Leader	NKK
Mr. Toshiharu YONEYAMA	Site Selection	KKC
Mr. Isamu KAWAKAMI	Steelmaking Technology	NKK
Mr. Hiroyuki KANEMOTO	Hot Strip Mill Technology	NKK
Mr. Yasuo ISE	Cold Strip Mill Technology	NKK
Mr. Kozo OKAMOTO	Raw Materials and Energy	KSL
Mr. Tamotsu INOUE	Utilities	KSL
Mr. Kusuo INOUE	Electrical Facilities	KSL
Mr. Shunji HOSOKAWA	Transportation	SRC
Mr. Koji SUENAGA	Project Planning	NKK
Mr. Minoru YAMAMURA	Environmental Assessment	NKK
Mr. Yasuo FUJINAGA	Financial Analysis	DIR

Note: NKK = NKK Corporation, KKC = Kokan Kensetsu Co. Ltd.
KSL = Kobe Steel, Ltd. SRC = Sinko Research Co. Ltd.
DIR = Daiwa Institute of Research Ltd.

The personnel of GOFI and JICA who participated in the study are shown in Appendix 1A-1.

1-3 Overall Schedule

The feasibility study was conducted from February 1997 to November 1997 on the following schedule.

Preparation	: February 1997
First field survey	: March 1997
First study in Japan	: April 1997
Second field survey(Stage-1)	: May 1997
Second field survey(Stage-2)	: June 1997
Second study in Japan	: July 1997
Third field survey	: August-September 1997
Third study in Japan	: September 1997
Forth field survey	: November 1997
Production of final report	: November-December 1997

Details of the field survey schedule are shown in Appendix 1A-2.

1-4 Principal Personnel Interviewed

During the field surveys in Egypt, the Study Team visited many authorities and corporations to collect data and information. The following are the principal personnel interviewed by the Study Team in Egypt.

Name	Authorities	Title
Mr. Hassan Safwat	GOFI	Deputy Chairman (Former)
Dr. Eid Hassan	GOFI	Deputy Chairman
Dr. Ibrahim Fawsy	GAFI	President
Mr. Yehia El Bahnassary	Suez Governorate	Governor (Former)
Gen. Mahmoud Salem	Alexandria Governorate	Secretary General
Mr. Hamdy Mohamed Mokhtar	Hurghada Governorate	Secretary General
Gen. Mahmoud El Gindi	Safaga City Council	The Head Master
R.Adm. Salah A. Mokhtar	Alex. Port Authority	Chairman
Commander Hussan Rasid	Red Sea Port Authority	Chairman
Eng. I.S.Mohammadain	ANSDK	Chairman
Mr. Abdel A. Danaf	MICOR	Chairman
Dr. Aly Helny	EISCO	Chairman
Mr. Hirotoshi TANAKA	Embassy of Japan	First Secretary
Mr. Zentaro YAMASHITA	Embassy of Japan	First Secretary

Note: GAFI = General Authority for Investment
MICOR = Holding Company for Metallurgical Industries
EISCO = Egyptian Iron & Steel Company
Gen. = General,
R. Adm = Rear Admiral

1-5 Consideration on Construction of Flat Product Plant

During the feasibility study on construction of flat ploduct plant, the Study Team conducted the study by taking account of the following local conditions.

1) Market and project size

- To minimize the project size and construction budget of the plant:

  Great market can not be expected in Egypt and the plant size shall be of an appropriate size.

2) Process selection

- To select the most appropriate process taking into account of domestic natural resources such as natural gas, electric power and water supply:

  Abundant natural gas and electricity shall be utilized. But, water is scarce, and high quality iron ore is not available. Scrap generation is limited.

3) Operation cost

- To minimize operation cost with the latest technology and small size of organization for management and operation:

  The plant shall be internationally competitive against imported products.

4) Plant site selection

- To make due consideration on location of present and future major market in Egypt:

  Transportation cost of products will affect seriously on the operation cost and price.

- To study on the availability of port facilities for unloading imported iron ores:

  If new exclusive port for the plant is constructed, it will affect seriously on the feasibility of the project.

- To study carefully on the existing and future construction plan of infrastructure:

  Utilization of existing infrastructure is indispensable for making investment cost lower.

- To pay attention on the environment of resort area:

  Most area of the sea shore, especially on the Red Sea, are designated as resort area for tourism and plant constructions are not allowed.

1-6 Summary

Studies have been principally carried out on the following subjects.

- Present situation of the Egyptian steel industry
- Production and demand for flat products in Egypt
- Plant site selection
- Concept of the flat product plant
- Environmental assessment

- Operating plan for the flat product plant
- Financial and economic analyses

Study results are outlined below.

1-6-1 Present situation of the Egyptian steel industry

There are fifteen steel companies in Egypt, and total production of crude steel was three million tons in 1995. However, almost 80 % of the crude steel was produced by two companies, Egyptian Iron and Steel Co.(EISCO) and ANSDK.
EISCO is an integrated steel plant equipped with blast furnaces (BF) and basic oxygen furnaces (BOF), and produced 1.3 million tons of crude steel. On the other hand, ANSDK is an integrated steel plant equipped with the direct reduction plant (DRP) and electric arc furnaces (EAF), and produced 1.2 million tons of crude steel in 1995.
For the time being, there are several plans for construction of steel plants and some of them are in the construction stage. Steel production in Egypt, including existing and newly planned plants, is supposed to reach five million tons per year by the year 2000.

At present, the principal steel product in Egypt is the reinforcing bar. Flat products are produced only by EISCO and annual production of hot and cold rolled products is about 560,000 tons. Some customers can not help importing flat products due to the facts that the maximum width of strip and sheet from EISCO is limited to one meter, and also, that its products do not necessarily meet quality requirements.

Regarding raw materials, EISCO uses domestic iron ore which is of a comparatively lower grade than the first class international level. On the other hand, ANSDK imports all iron ores, lump ore and pellet, to meet the quality requirements of the DR process. ANSDK uses scrap, as raw materials fed to the electric arc furnace, from domestic sources as well as imported scrap.

1-6-2 Production of and demand for flat products in Egypt

The market for flat products in Egypt was reviewed and estimated based on the Phase-1 report with some revisions taking into consideration the final use of the products, quality requirements and product size, as well as the trend of demand on the grade of each product. As a result of this review and revision, it is estimated that the demand of flat products to be produced by the flat product plant will be 986,000 tons in 2005 for the case of moderate GDP growth as specified by the Phase-1 report.

This quantity will become 1.713 million tons by 2015. (Refer to Table 5-1-4)

The kinds of products will be hot rolled products including small amounts of plate, cold rolled products and galvanized products. It is assumed that the plant shall not produce tin plate because the present demand and estimate for future demand are not high enough to justify construction of facilities to produce tin plate.

Taking account of all the above, the production and products of the flat products plant are assumed as follows in the 1st stage and the feasibility study shall be conducted on this basis.

Production capacity		
- Slab	:	1,000 thousand tons/year
- Hot rolled products	:	638 thousand tons/year
including		
Hot rolled coil	:	541 thousand tons/year
Plate	:	97 thousand tons/year
- Cold rolled coil	:	224 thousand tons/year
- Galvanized products	:	71 thousand tons/year
- Total of products	:	933 thousand tons/year

As for the future 2nd stage expansion, it is assumed that the expansion plan shall not be implemented before 2015 due to the fact that the estimated market for flat products is not big enough to support production of two million tons per year before 2015.

1-6-3 Plant site selection

GOFI proposed three sites at Safaga, Suez and Alexandria as the candidates for the plant site to be studied by the Study Team. The Study Team surveyed the actual conditions of these sites on the first field survey and evaluated them based on the evaluation criteria prepared, taking account of the necessary conditions for construction and operation of a flat products plant.

- Possibility of obtaining land of sufficient area
- Existing port facilities or future construction plan of port facilities

necessary for the import of raw materials and shipping of products
- Supply facilities of natural gas and industrial water
- Waste water treatment system
- Environment of the site such as supporting industries and social conditions
- Distance between major market and quality of transportation facilities

Although GOFI proposed the three above sites in the first survey, the conditions at all these sites did not satisfy the requirements described above. The Study Team requested GOFI to reconsider the proposed sites taking account of these conditions. Consequently, GOFI proposed two sites at the Adabiya Industrial Free Zone (I.F.Z.) in Suez and El Dekhiela in Alexandria.

The Study Team surveyed these sites and concluded that the conditions at both sites technically met the requirements. However, it was found that the ground elevation of the Adabiya I.F.Z. varies from approximately 15 to 50 m above the sea water level and the gradient is approximately 2.2 to 3.5 %. In order to make one or two horizontally plane surfaces, a large amount of earth work and relocation work are required. Further more, due to the low quality of industrial water, a large scale desalination plant is necessary to purify water to the appropriate quality level. These requirements seriously affect construction and operating costs of the plant. Although there is some interest in a construction plan for Adabiya port, this has not been studied deeply enough to make a concrete plan.
It is concluded that the Adabiya I.F.Z. is not an appropriate site to conduct further feasibility studies for the flat products plant.

On the other hand, the El Dekhiela site is close to the ANSDK, existing integrated steel plant, and the existing infrastructure to supply electric power, natural gas and industrial water is available without additional facilities. It will be convenient for the flat product plant that the existing facilities of the mineral jetty of El Dekhiela port is jointly operated with ANSDK.
Although the depths of the berths at other Egyptian ports is not deeper than 15 m and can accept up to 80,000 DWT bulk cargo, the El Dekhiela berth is 20 m deep and can accept 120,000 DWT bulk cargoes which is helpful in reducing freight rates for transportation of iron ores.

As a result, it is estimated that construction and operating costs at El Dekhiela will be comparatively lower than that for the Adabiya I.F.Z.

Taking into consideration the economical evaluation described above, it was decided that further feasibility study should be conducted assuming that the flat steel plant are to be constructed at the El Dekhiela site.

1-6-4 Concept of the flat product plant

The annual production capacity of the flat product plant was studied taking into consideration the size of the Egyptian market and the economical size of the plant, and was set at one million tons for the 1st stage to be expanded to two million tons for the 2nd stage when market demand increase enough to support expansion of the capacity.

Taking into consideration the production capacity of the plant, domestic natural resources such as natural gas and scrap supply sources in Egypt, a direct reduction plant (DRP) and an electric arc furnace (EAF) process were selected. This combination will enable the plant to take advantage of domestic natural gas and electric power, and reduce construction costs when compared with the conventional process of blast furnace (BF) and basic oxygen furnace (BOF).

The hot rolling mill will be semi-continuous mill suitable for producing many grades of strip products for small orders as well as plate.
Production capacity of the cold strip mill will be much smaller than a conventional large scale plant, and equipped with the combination of a push-pull type pickling line, a reverse cold mill and batch annealing furnaces. In addition, a continuous galvanizing line will be installed to meet the demands of the domestic market.

Total construction period will be fifty five months (four years and seven months) from the start of basic engineering to the production start-up, or thirty five months (two years and eleven months) from the effective date of the purchasing order to the production start-up.

The plant general layout was produced allowing space for the future 2nd stage expansion.

1-6-5 Environmental assessment

An environmental assessment was conducted on the principle pollutants of NOx, SOx and dust as well as noise and effluent COD which are supposed to be emitted from the flat steel plant with reference to the following standards.

- Emission limit

  Comparison of the predicted emissions with Egyptian standards

- Environmental standard

  Comparison of the pollution level, which was calculated by simulation using the actual data from the site and the predicted emission level from the flat product plant, with Egyptian standards

As a results of the assessment, the emission value from the plant and environmental pollution near the site will be maintained within the limits of Egyptian environmental standards.
The emissions other than the above mentioned principle pollution are also estimated far below the limit of the emission standard.

Therefore, it can be said that pollution will be kept within the limits of Egyptian standards provided the flat product plant is constructed equipped with the environmental control systems described in this report.

1-6-6 Implementation plan

(1) Financing

For this feasibility study, the project cost is assumed to be US$ 1.1 billion , of which 30 % would be self invested, and the 70 % balance from loans. This will be financed as follows.

1) Capital

Taking the current governmental privatization policy into consideration, it is presumed that the project should be led and carried out by the private sector, and the entire capital be privately financed accordingly.

2) Loans

In addition, investment and operating costs should be financed by both long-term and short-term loans to be allocated as follows;

- Capital :
  Construction cost of the production facilities,
- Long-term Loans :
  Construction cost of the production facilities, incorporation expenses and interest payments during construction
- Short-term Loans :
  Operating costs after start-up

(2) Organization and personnel

In order to make the flat products plant internationally competitive plant, production costs shall be kept as low as possible. For this purpose, it is strongly requested to make the number of employees as small as possible together with a simplified organization for the company. This study proposes an organization and manning schedule to be internationally competitive and flexible enough to meet the various customer requirements for flat products taking into consideration world class productivity.
Consequently, the number of employees of the plant is set at 1,550 personnel including 144 personnel for indirect production and 1,406 personnel for the production plants.

As sophisticated operating technology is required for smooth and effective operation of the direct reduction process, electric arc furnace and strip mills, it is recommended to employ some key persons who have operating experience with similar plants in Egypt. The organization, manning schedule and training program for the production department shall be planed making these persons central figures of each group.

Furthermore, in order to establish a reliable plant management system and realize stable early operation, it is recommended to make a consulting agreement with a foreign steel company at least for three years, and introduce management and operating technology for each area of management and production.

(3) Sales

It is assumed that most of the flat products shall be delivered to domestic customers and they will not be exported extensively. A sales and marketing department shall be organized to take care of the domestic market only .

Small lots of product order shall be supplied after shearing or slitting based on order specifications by coil centers located near the site of the major markets for the flat products.

(4) Research and development

Judging from the Egyptian flat product market, a large demand for high grade products can not be expected at the initial stage. Most of the product will be of commercial grade. Therefore, it is recommended to introduce operating technology from an outside steel company as occasion demands without organizing a large scale research and development center.

This may be organized when requirements for high grade products increase due to changes in the market in future.

(5) Future expansion

Production capacity in the 1st stage is assumed to be one million tons per year to be expanded to two million tons per year in future. However, judging from the results of the review of the market study conducted in Phase-1, domestic market demand will not reach two million tons per year by 2015. Consequently, the expansion plan will be put into practice after 2015 taking into consideration the actual trend of the domestic flat products market.

1-6-7 Financial analyses

(1) Statement

Financial analyses are conducted to evaluate the profitability, efficiency, solvency and overall feasibility of the construction of the flat product plant based on some pre-conditions of investment, production, sales price, tax and duties, operation expenses and several financing activities.

As a results of the financial analyses, following financial statements are prepared.

- Profit and loss statement
- Balance sheet
- Cash flow statement

Profitability of the project is quite high and gross profit margin stabilized at 42 % after the third year. Net profit margin remains at the level of more than 25 % after four years from the start-up.

(2) Evaluation of project feasibility

Internal rate of return (IRR) on total investment (ROI) and IRR on equity (ROE) are calculated. The results of the calculation are as follows;

- ROI before tax	: 14.4 %
- ROI after tax	: 12.6%
- ROE	: 21.8 %

ROI before tax is greater than the weighted average cost of loans of 7 % used in the study, and even greater than the general financing cost of 11 % to 13 % in financial markets. ROE greater than 20 % is attractive enough for investors. From the point described above, the analysis on IRR safely concludes that the Project is feasible.

ROI after tax, however, is 12.8 %, which is almost equal to the general financing cost. ROE is 16 % with interest on long-term loans of 12 %. These results raise a delicate issue on the feasibility of the plan with respect to governmental involvement. It implies tax exemption and other measures will be preferable.

Chapter 2

STEEL PRODUCTION IN EGYPT

Chapter 2. STEEL PRODUCTION IN EGYPT

2-1 Outline of the Egyptian Steel Industry

2-1-1 Existing plants

There are fifteen steel companies in Egypt, six of which have steelmaking shops and produce crude steel. Crude steel production in Egypt was three million tons in 1994. However, more than 80 % of the crude steel was produced by two major companies, EISCO (Egyptian Iron and Steel Co.) and ANSDK (Alexandria National Iron and Steel Co.).

EISCO is an integrated steel plant producing steel products from blast furnaces (BF) and basic oxygen furnaces (BOF). Production of crude steel was 1.3 million tons in 1994. It is the only company which produces flat products in Egypt. ANSDK produces crude steel from the direct reduction process (DR process) and electric arc furnace (EAF). Production of crude steel was 1.2 million tons in 1994. ANSDK produces steel bars and rods.

The open hearth furnace (OHF) steel share is very small.

Production of flat products is almost 0.5 million tons per year and the remaining products are mostly bars and rods for construction.

An outline of the existing steel plants are shown in Table 2-1-1. and Table 2-1-2.

2-1-2 Future expansion and construction plans

In addition to the existing steel companies, recently there are several plans for expansion of existing plants and construction of new ones. In 2000, when these projects are completed and start production, production capacity of crude steel is expected to reach five million tons per year.

Future provisions for crude steel production are shown in Table 2-1-2.

Table 2-1-1 Existing Steel Plant in Egypt

Unit: 1,000 ton

	Company	Process & products			Production
		SMP	Long	Flat	
Public sector	EISCO	○	○	○	880
	NMI (The National Metal Ind.)	○	○		151
	DSC (Delta Steel Mill Co.)	○	○		123
	ECW (Egyptian Copper Works Co.)	○	○		54
Joint venture	ANSDK	○	○		1,132
&	El Baraka	○	○		209
Private sector	El Hawary		○		150
	El Shinawy		○		48
	Port Said Co.		○		150
	Vector Ayad		○		25
	El Temish	○	○		15
	Mostafa Sarhan Co.		○		30
	Kouta		○		
	El Hoda Misr		○		67
	Youssry		○		

Source : JICA Phase-1 report

Note :SMP = Steelmaking Plant,
Long = Long products (Bar & rod)
Flat = Flat products

2-1-3 Locations

Although most of these steel works are located near Cairo including Kalioubia, most of the products are produced in Helwan and Alexandria. Some companies are constructing new works in the new industrial zone of Sadat City and 10th of Ramadan City.

Locations of works are shown in Figure 2-1-1.

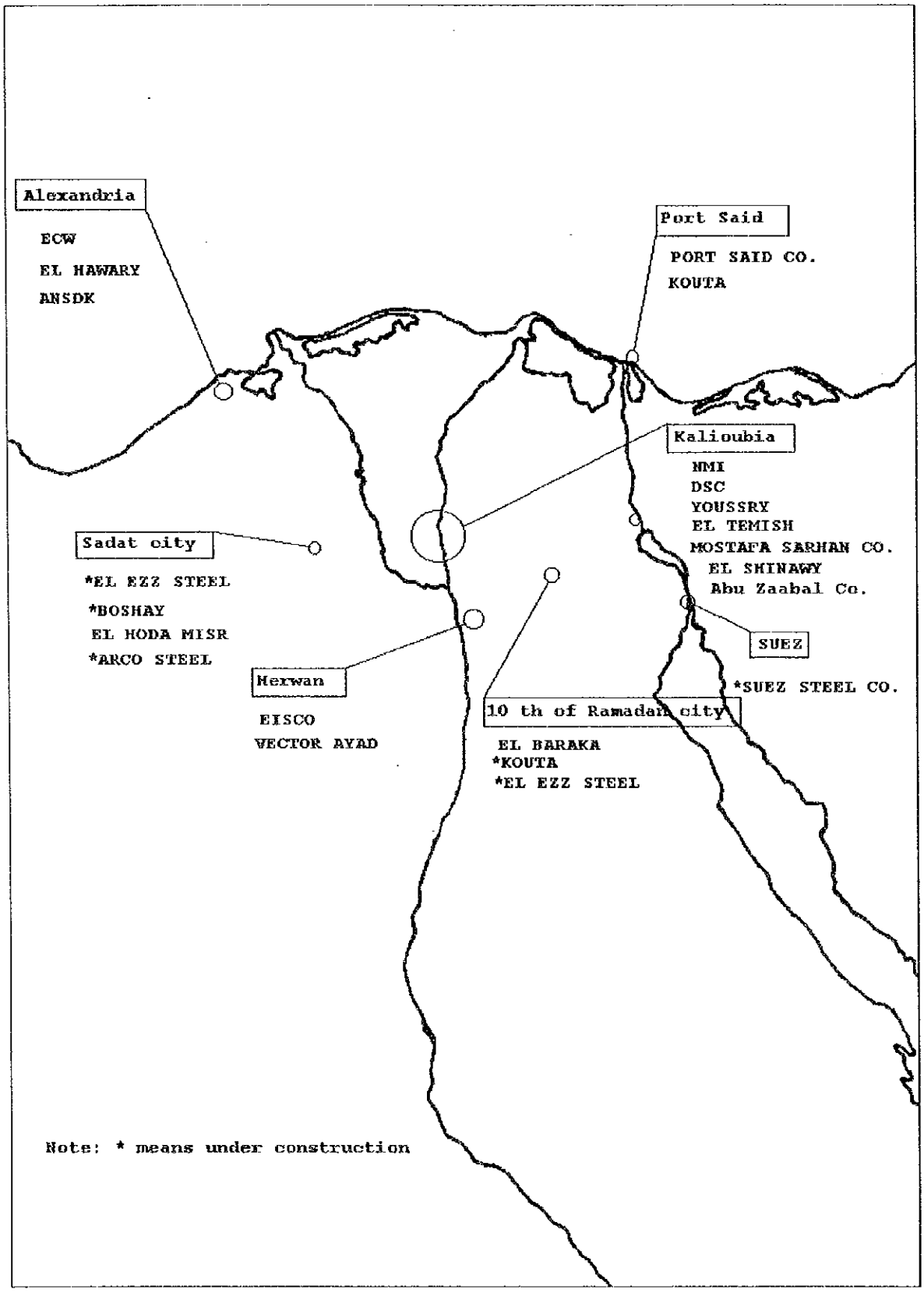
Table 2-1-2 Crude Steel Production in Egypt

Unit: 1,000 ton

Company	Process	Location	1995	2000	Products
Existing plant					
ANSDK	DR/EAF	Alexandria	1,306	1,789	Bar & rod
EISCO	BF/BOF	Cairo	1,151	1,270	Flat, Section
NMI	OHF,EAF	Kalioubia	192	260	Bar
DSC	EAF	Kalioubia	144	160	Bar
ECW	EHF	Alexandria	151	160	Bar
El Termish	EAF	Kalioubia	37	37	
Under construction or planned					
ARCO Steel	EAF	Sadat City	-	165	Special steel
El EZZ Steel	EAF	Sadat City	-	316	Bar
Abu Zaabal		Kalioubia	-	42	
Suez Steel	EAF	Suez	-	632	Billet
Al Atiuo Co.			-	85	Bar
Boshay		Sadat City	-		Bar
Kouta		10th of Ramadan City	-		
Total			2,981	4,916	

Source : JICA Phase-1 report

Figure 2-1-1 Location of Steel Works



2-2 Flat Product Production and Demand in Egypt

The supply of and demand for flat products are shown in Table 2-2-1. Apparent average consumption was 0.77 million tons during six years from 1990 to 1995. The yearly flat product production of approximately 0.56 million tons is produced by EISCO. Accordingly, imports of flat products reach approximately 0.21 million tons per year. Exports of flat steel products excepting welded pipes are negligible.

Table 2-2-1 Apparent Consumption Trend of Flat Products

Unit: 1,000 ton

	1990	1991	1992	1993	1994	1995	Ave.
Production	514	609	422	516	583	729	562
Import	201	192	182	209	171	295	208
Export	-	-	-	-	-	-	-
Apparent Consumption	715	801	604	725	754	1,024	770

Source : IISI 1996 report

Chapter 3

FLAT PRODUCT MARKET IN EGYPT

Chapter 3. FLAT PRODUCT MARKET IN EGYPT

3-1 Consumption of Flat Products in Egypt

Trends of production and import of flat products for the last six years are shown in Tables 3-1-1 and 3-1-2 respectively. Export of flat steel products is negligible.

The apparent flat steel product consumption (production + import - export) in Egypt is indicated in Table 3-1-3. The total consumption was 600,000 - 800,000 tons per year.

Table 3-1-1 Production Trend of Flat Products

Unit: 1,000 ton

Products	1990	1991	1992	1993	1994	1995	Ave.
Hot rolled coil & plate	387	409	281	380	412	522	399
Cold rolled coil & sheet	123	195	137	133	169	205	160
Galvanized coil & sheet	4	5	4	3	2	2	3
Total	514	609	422	516	583	729	562

Source: JICA Phase-1 report(revised by IISI 1996 report)

Table 3-1-2 Import Trend of Flat Products

Unit: 1,000 ton

Products	1990	1991	1992	1993	1994	1995	Ave.
Hot rolled coil & plate	54	57	52	77	105	124	78
Cold rolled coil & sheet	42	34	25	27	27	71	38
Galvanized coil & sheet	34	1	35	31	28	37	28
TIN & TFS sheet	56	62	58	55	-	47	46
Electrical sheet	5	2	3	3	4	2	3
Other coated coil & sheet	9	36	10	15	7	13	15
Total	200	192	183	208	171	294	208

Source: JICA Phase-1 report(revised by IISI 1996 report)

Table 3-1-3 Apparent Flat Product Consumption

Unit: 1,000 ton

Products	1990	1991	1992	1993	1994	1995	Ave.
Hot rolled coil & plate	441	466	333	457	517	646	477
Cold rolled coil & sheet	165	229	162	160	196	276	198
Galvanized coil & sheet	38	6	39	34	30	39	31
TIN & TFS sheet	56	62	58	55	-	47	46
Electrical sheet	5	2	3	3	4	2	3
Other coated coil & sheet	9	36	10	15	7	13	15
Total	714	801	605	724	754	1023	770

Source: JICA Phase-1 report(revised by IISI 1996 report)

3-2 Current Steel Consumption by Customers and End Users

3-2-1 Outline of surveyed consumers

The Study Team selected some representative companies from each product category and visited their factories in order to define flat product specifications.

The following table shows outlines of these companies.

Quality and size requirements by these consumers are summarized in Table 3-2-6.

Table 3-2-1 Outline of Surveyed Companies

No	Category	Company Name	Outline of the Company
1	Metal furniture	MOHM	1) Established year; 1974 2) No. of employees; 1,100 3) Products; furniture, metal pipe, grating, etc. 4) Flat steel consumption; - cold rolled coils; 12,000 t/y - galvanized coils; 500 t/y
2	Metal furniture	Mobica	1) Established year; 1985 2) No. of employees; 200 3) Products; steel cabinets, car sheets, chair, etc. 4) Flat steel consumption; - cold rolled coils & sheets; 840 t/y

No	Category	Company Name	Outline of the Company
3	General structure	Ferro Metalco	1) Established year; 1986 2) No. of employees; 1,100 3) Products; heavy structure, heat exchanger, etc. 4) Flat steel consumption; - plate; 8,000 t/y - hot rolled sheets; 600 t/y
4	Ditto	The Arab Contractors	1) Established year; 1959 2) No. of employees; 3,000 3) Products; heavy structure, vessels, etc. 4) Flat steel consumption; - hot rolled sheets; 15,000 t/y
5	Construction	Egyptian Italian Co. & Kandeel Co.0	1) Established year; 1992 2) No of employees; 150 3) Products; Corrugated sheets, Section pipe, Steel structure ERW pipe etc. 4) Flat steel consumption; - hot rolled coil; 10,000 t/y - cold rolled coil; 15,000 t/y - galvanized coil; 25,000 t/y - color coated coil; 10,000 t/y
6	Construction	ALPHAMETAL	1) Established year; 1980 2) No. of employees; 150 3) Products; Corrugated sheets,Steel structure 4) Flat steel consumption - galvanized coil; 1,200 t/y - color coated coil; 2,400 t/y
7	Ship building	Suez Shipyard	1) Established year; 1897 2) No. of employees; 700 3) Products; ship repair, Steel structure, etc. 4) Flat steel consumption; - plate and hot rolled sheets; 2,200 t/y

No	Category	Company Name	Outline of the Company
8	Automobiles	SUZUKI Egypt	1) Established year; 1989 2) No. of employees; 355 3) Products; passenger cars, commercial vehicles, etc. 4) Flat steel consumption; - hot rolled sheets; 50-55 t/y - pickled sheets; 10-15 t/y - cold rolled sheets; 60-70 t/y - galvanized sheets; 10-15 t/y
9	Ditto	EL NASR Automobile Manufacturing Co. (NASCO)	1) Established year; 1959 2) No. of employees; 9,000 3) Products; bus, truck, tractor, passenger car 4) Flat steel consumption; - hot rolled sheets; 3,360 t/y - cold rolled sheets; 3,350 t/y - cold rolled coil; 200 t/y - galvanized sheets; 80 t/y
10	Automobiles	Engineering Company for Exhaust System	1) Established year; 1987 2) No. of employees; 150 3) Products; exhaust system,small parts for automobile 4) Flat steel consumption;
11	Home appliances	Ideal	1) Established year; 1984 2) No. of employees; 1,000 3) Products; refrigerator, washing machine 4) Flat steel consumption; - cold rolled sheets; 2,750 t/y - galvanizing sheets; 143 t/y
12	Canned food	El-NASR Food Co.	1) Established year; 1976 2) No. of employees; 2,500 3) Products; canned food 4) Flat steel consumption; - tinplate; 2,500 t/y

	Category	Company Name	Outline of the Company
13	Canned food	The Edfina Co. for Preserved Foods	1) Established year; 1972 2) No. of employees; 185 3) Products; canned food 4) Flat steel consumption; - TIN plate; 2,600 t/y - TFS plate; 1,400 t/y
14	Steel pipes	EL-NASR STEEL PIPES & FITTINGS	1) Established year; 1965 2) No. of employees; 3,500 3) Products; ERW pipes, Spiral SAW pipes 4) Flat steel consumption; - hot rolled coil; 110,000 ton/y

Source: Interviews with customers during the first & second field survey

3-2-2 Location of major flat product consumers

Referring to the data surveyed in Phase-1, the Study Team selected major consumers of flat products in each category of end use and investigated the locations.

Then the Study Team classified them into eight major industrial zones.

Table 3-2-2 shows the major industrial zones and the numbers of major consumers of flat products by category of end use. About 50 % of consumers are located in the Cairo zone and within 25 km of Cairo. The following seven major industrial zones, except Upper Egypt, are also located within about 250 km of Cairo and they are connected by a well maintained road system. Upper Egypt is very far from Cairo, however the number of consumers in this zone is very small and can consequently be removed from consideration.

Figure 3-2-1 represents the location of major industrial zones and the number of customers classified by end use category in the zone.

Therefore it could be said that the location of the flat product plant, whether it is chosen to be the Suez I.F.Z. or El Dekhiela in Alexandria, does not have any major impact on operating costs from the view point of the clients' location.

Table 3-2-2 Distribution of Major Consumers

Use of flat steel products	Cairo & within 25km	Alex-andria	10th of Ramadan, Sharkia	6th October & Sadat	Suez	Port Said	Ismailia	Upper Egypt	Total
Construction	5		4			1			10
Shipyards	1	2			2	3	1		9
Weld pipes	4								4
Home appliances	15	6	11	3				2	37
Automobiles	8		3	3			1		15
Food cans	6	4							10
Metal furniture	6								6
Pressure vessels	1								1
Railway vehicles	1								1
Gas cylinders			1						1
Metal containers						4			4
Others									
Total	47	12	19	6	2	8	2	2	98

Source: interviews with GOFI & consumers

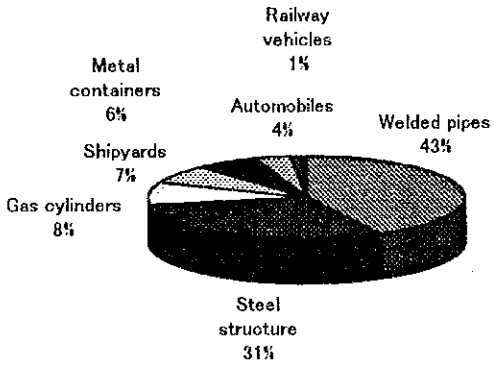
3-2-3 Consumption of flat products by end use category

Table 3-2-3 shows flat product consumption by product category in 1995 and also shows the flat products required.

From Table 3-2-3 the following can be drawn.

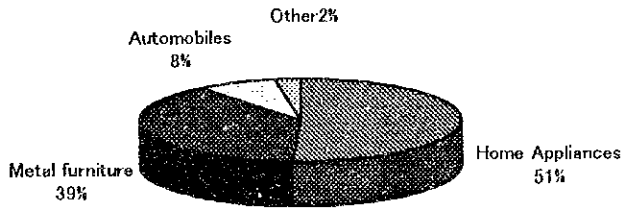
(1) Consumers of hot rolled products including plate are manufacturers of;

- Welded pipe (43 %)
- Steel structures (31 %)
- Gas cylinders (8 %)
- Ship yards (7 %)
- Metal containers (6 %)
- Automobiles (4 %)
- Railway vehicles (1 %)
- Pressure vessels (0.2 %)
- Others (0.4 %)



(2) Consumers of cold rolled products are manufacturers of;

- Home appliances (51 %)
- Metal furniture (39 %)
- Automobiles (8 %)
- Other (2 %)



(3) Consumers of galvanized products are constructors, home appliances and automobiles.

(4) Consumers of TIN & TFS are manufacturers of food cans.

Table 3-2-3 Consumption by Product Category

Use of Flat Products	Consumption t/y in 1995	Rate (%)	Products				
			Plate	Hot rolled	Cold rolled	Galva-nized	TIN
Steel structures Corrugated sheet	176,350 13,500	21.1	x	x		 x	
Shipyards	41,700	5.0	x	x			
Welded pipe	246,889	29.6		x			
Home appliances	72,249	8.7			x (91 %)	x (9 %)	
Automobiles	31,787	3.8		x (67.5 %)	x (32.5 %)		
Food cans (Note)	17,279	2.1					x
Metal furniture	50,000	6.0			x		
Pressure vessels	1,350	0.2	x	x			
Railway vehicles	6,338	0.8	x	x			
Gas cylinders	48,960	5.9		x			
Metal containers	10,000	1.2		x			
Other government	26,200	3.1		x	x		
Other	91,313	10.9		x	x	x	
Total	833,915	100.0					

Source: JICA Phase-1 report

Note: As for the flat products consumed for food cans, galvanized products are listed in the Phase-1 report, but as a result of visiting food can companies it turned out that they were not consuming galvanized products. Therefore the Study Team excluded it and regarded all consumption as TIN & TFS.

3-2-4 Consumption of flat products by location

(1) Total flat steel product consumption in major industrial zones

In order to investigate consumption in each area, the Study Team analyzed data from the JICA Phase-1 report by counting the number of major consumers of flat products belonging to each zone as well as calculating the share of consumption in accordance with each end use category. Table 3-2-4 and Figure 3-2-1 show total flat steel product consumption in 1995 in major

industrial zones.

As shown in Table 3-2-4 and Figure 3-2-1, currently nearly 80 % of flat steel products are consumed in the Cairo area (including 10th of Ramadan City and 6th October City). 99 % is consumed within 250 km of Cairo.

Consequently, as well as the conclusion stated in Section 3-2-2 the location of the steel plant, whether it is chosen to be the Suez I.F.Z. or El Dekhiela in Alexandria, does not have any major impact on operating costs from the view point of transportation costs.

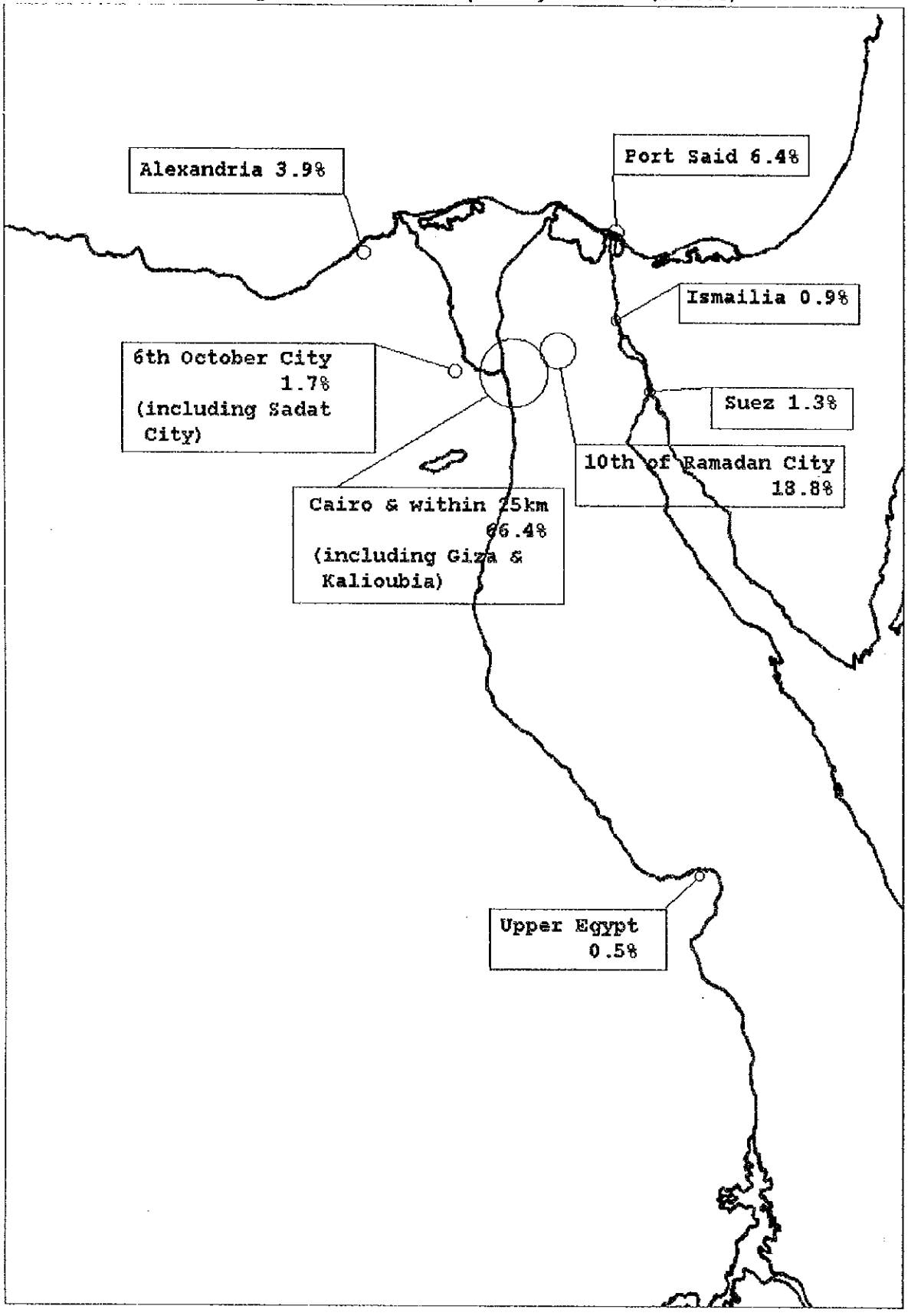
Table 3-2-4 Consumption by Location

(Unit:t/y)

Use of Flat Products	Cairo & within 25km	Alex-andria	10th of Ramadan, Sharkia	6th October & Sadat	Suez	Port Said	Ismailia	Upper Egypt	Total
Construction	110,200		44,100			22,000			176,300
Corrugated sheet			13,500						
Shipyards	4,600	9,300			9,300	13,900	4,600		41,700
Welded pipe	246,900								246,900
Home appliances	29,300	11,700	21,500	5,900				3,900	72,300
Automobiles	17,000		6,400	6,400			2,100		31,900
Food cans	10,400	6,900							17,300
Metal furniture	50,000								50,000
Pressure vessels	1,400								1,400
Railway vehicles	6,300								6,300
Gas cylinders			49,000						49,000
Metal containers						10,000			10,000
Total	476,100	27,900	134,500	12,300	9,300	45,900	6,700	3,900	716,600
(%)	66.4	3.9	18.8	1.7	1.3	6.4	0.9	0.5	100.0

Note: In the above table consumption of "other" is excluded.

Figure 3-2-1 Consumption by Location (in 1995)



(2) Flat product consumption in each major industrial zone

Table 3-2-5 shows flat product consumption by location analyzed in (1) above.

Table 3-2-5 Products by Location

(Unit:t/y)

Use of flat products	Cairo & within 25km	Alex-andria	10th of Ramadan, Sharkia	6th October & Sadat	Suez	Port Said	Ismailia	Upper Egypt	Total
Construction									
-Hot rolled	110,200		44,100			22,000			176,300
-Galvanized			13,500						13,500
Shipyards									
-Hot rolled	4,600	9,300			9,300	13,900	4,600		41,700
Welded pipe									
-Hot rolled	246,900								246,900
Home appliances									
-Cold rolled	26,70	10,600	19,600	5,400				3,500	65,800
-Galvanized	2,600	1,100	1,900	500				400	6,500
Automobiles									
-Hot rolled	11,500		4,300	4,300			1,400		21,500
-Cold rolled	5,500		2,100	2,100			700		10,400
Food cans									
-TIN & TFS	10,400	6,900							17,300
Metal furniture									
-Cold rolled	50,000								50,000
Pressure vessels									
-Hot rolled	1,400								1,400
Railway vehicles									
-Hot rolled	6,300								6,300
Gas cylinders									
-Plate & hot rolled			49,000						49,000
Metal containers									
-Plate & hot						10,000			10,000

Use of flat products	Cairo & within 25km	Alexan-dria	10 th of Ramadan, Sharkia	6 th October & Sadat	Suez	Port said	Ismailia	Upper Egypt	Total
Total	476,100	27,900	134,500	12,300	9,300	45,900	6,700	3,900	716,600
-Plate & hot rolled	380,900	9,300	97,400	4,300	9,300	45,900	6,000	0	553,100
-Cold rolled	82,200	10,600	21,700	7,500	0	8,500	700	3,500	134,700
-Galvanized	2,600	1,100	15,400	0	0	0	0	400	19,500
-TIN	10,400	6,900	0	0	0	0	0	0	17,300

3-2-5 Consumers quality requirements for flat products

During the first and second field survey, the Study Team visited fifteen major flat products consumers.

The following are typical requirements from these consumers.

(1) Plate and hot rolled products ;

- supply of wider plates and coils from local supplier (The width available in the local market is less than 1,000mm)
- improved quality of shape, surface flatness, surface texture and component homogeneity of plate thicker than 8 mm
- supply of special steel such as ST52 from local supplier

(2) Cold rolled products ;

- supply of good quality products from local supplier (surface finish, steel components, etc.)
- supply of deep drawing quality products from local supplier

(3) Galvanized products

During the first field survey, the Study Team visited an automobile company and two home appliance companies . However, as their amount of galvanized steel consumption was very low (and almost all of that imported) the Study Team could not gather sufficient information. In the case of home appliances, they required deep drawing quality.

In the 2nd field survey the Study Team selected two metal profilers for investigation. As a

result it turned out that more than 30,000 ton/year of galvanized products were consumed for construction. At their shops galvanized sheets are roll-formed into corrugated sheets and shipped to construction sites or end users.

In the case of corrugated sheet it will require only commercial quality with 200-300 g/m^2(both sides) of coating weight.

(4) Tinplate(TIN)

At present no tinplate is produced in Egypt and all of it imported. With regard to imported tinplate they have some small quality problems excepting products imported from Japan. In Egypt usage of glass and plastic bottles is increasing rapidly. Can use will not increase in future.

Table 3-2-6 Quality & Dimension Request to Flat Products

Flat products	End use & consumers		Delivery	Quality and dimension request	Necessary dimensions	
	End use	Company			Thickness	Width
Plate & hot rolled products	Construction (Steel Structure)	Ferrometalco	Sheet	* Plates wider than 1,500mm from the local market * Improvement shape for thicker plates(>8mm) * Good quality of thicker material (>20mm) * Uniform thickness * Grade ST37, ST52	3-60mm	1,000-2,500mm
		the Arab Contractors	Sheet			
	Shipyard	Suez Shipyard	Sheet	* No special requirements	8-30mm	
	Steel pipe	EL-NASR Steel Pipes & Fittings	Coil	* No special requirements * Coils wider than 1,000mm from the local market	2.5-12.7mm	Max.1,500mm
	Automobiles	NASCO	Sheet	* Grade ST37, ST44, ST52 * Sheets wider than 1,000mm from the local market		Max.1,500mm
Cold rolled Products	Home appliances	IDEAL	Sheet	* No special requirements	0.5-1.5mm	Max.1,000mm
	Metal furniture	MOHM	Sheet	* Normal carbon steel from the local Market * Products of good surface steepness * Good surface finished products	0.5-2.0mm	720-1,250mm
		Mobica	Sheet	* Uniform bending formability * Deep drawing quality		

Flat products	End use & consumers		Delivery	Quality and dimension request	Necessary dimensions	
	End use	Company			Thickness	Width
				* Grade SPCC, SPCD, SPCE * Sheets wider than 1,000mm from the local market		
	Automobiles	Suzuki Egypt	Sheet	* Good quality for automobiles * Deep drawing quality		
		NASCO	Sheet	* Grade ST14, ST12		Max.1,000mm
		Engineering Co. for Exhaust Systems	Sheet	* No special requirements	1.0–3.0mm	Max.1,250mm
Galvanized Products	Construction (Corrugated sheets)	Egyptian Italian Co.	Sheet & Coil	* No special requirements	0.5–1.25mm	Max.1,250mm
		ALPHAMETAL	Sheet & Coil	* No special requirements	0.3–1.1mm	Max.1,300mm
	Home appliances	IDEAL	Sheet	* No special requirements	1.25–1.5mm	Max.1,000mm
	Metal furniture	MOHM	Sheet	* No special requirements (for construction use)	0.3–0.8mm	Max.1,250mm
	Automobiles	Suzuki Egypt	Sheet	* No special requirements (for exhaust pipe)		
		Engineering Co. for Exhaust Systems	Sheet	* Aluminized products & Zn–Ni coated sheets (Consumption of galvanized is very small.)	0.6–1.5mm	Max.1,250mm
TIN & TFS Products	Canned food	EL-NASR Canned Food	Sheet	* Hardness control * Uniform thin oil film	0.18–0.28mm	515–720mm
		The Edfina Co. for Preserved Foods	Sheet		0.18–0.20mm	730–760mm