

**Appendix 2A-1 Investigation on Steel Works in Egypt**  
(エジプトにおける製鉄所の調査)



## Appendix 2A-1 Investigation on Steel Works in Egypt

(エジプトにおける製鉄所の調査)

### 1. はじめに

エジプトには、一貫製鉄所1社、ヘルワン製鉄会社 (Egyptian Iron & Steel Co.) と ANSDK (Alexandria National Iron and Steel Co.) に代表されるミニミル5社および単圧工場数社があり、さらに建設中又は計画中のミニミルがいくつかある。

薄板工場の主生産設備は、還元鉄工場、電気炉、スラブ連铸機、ホットストリップミル、コールドストリップミルである。薄板工場を計画するに当り、コンサルタント調査団は第1次現地調査で、還元鉄工場および大容量の電気炉が稼動している ANSDK、第2次現地調査でスラブ連铸機、ホットストリップミル、コールドストリップミルが動いているヘルワン製鉄所を訪問した。

コンサルタント調査団の ANSDK とヘルワン製鉄所の訪問は、生産、設備、原料その他の資料を収集することが目的である。これらの資料を、手持ちのものとあわせて下記に述べる。

### 2. ANSDK

#### 2-1 概要、生産、組織

##### 2-1-1 ANSDK の概要

ANSDK は 1982 年に、建設用鉄筋棒鋼の製造販売を目的に設立され私企業として運用されている。製鉄所はアレキサンドリアの西方 15 km のエル・ディケーラに位置しエル・ディケーラ港に面しており、敷地は約 300 フェツダン (126 万 m<sup>2</sup>) である。鉄筋棒鋼の製造プロセスは、還元鉄プロセス—電気炉—連続铸造機—圧延機である。本社は、製鉄所の中にあり、カイロに支社がある。会社のトップはモハメディン会長で、従業員は約 2,600 人である。

エル・ディケーラ製鉄所の建設は 1983 年に始まり、最初に生産設備として製鋼工場が 1986 年 5 月に生産を開始し、1987 年に製鉄所は一貫ミニミルとして完成した。製鉄所は日本コンソーシアムの技術協力を得て、トップの優れた管理により立上り以来順調に稼動している。生産量は 1995 年には 123 万トンに達し、これは標準能力の 74 万 5,000 トンの 1.6 倍である。稼動以来の生産量を表 2A-1-1 に示す。

Table 2A-1-1 Production Activities from Start-up

Unit: 1,000 ton

Year	Quantity
1986	47
1987	428
1988	825
1989	932
1990	970
1991	1,000
1992	1,035
1993	1,102
1994	1,132
1995	1,234
1996	1,119
Total Accumulated	9,824

Source: ANSDK

ANSDK は、生産能力を上げるため 1994 年 11 月以来、生産合理化拡張プロジェクトおよび第 2 還元鉄工場プロジェクトを進め、これらの拡張プロジェクトは 1997 年 9 月に完成した。年産能力は、150 万トンでエジプトで第一の生産量となる。

ANSDK は、エル・ディケーラ製鉄所は成功裡に稼動しており、これはサイトの選定に当たって、結果的に次の主要で大事な要因にあることを強調した。

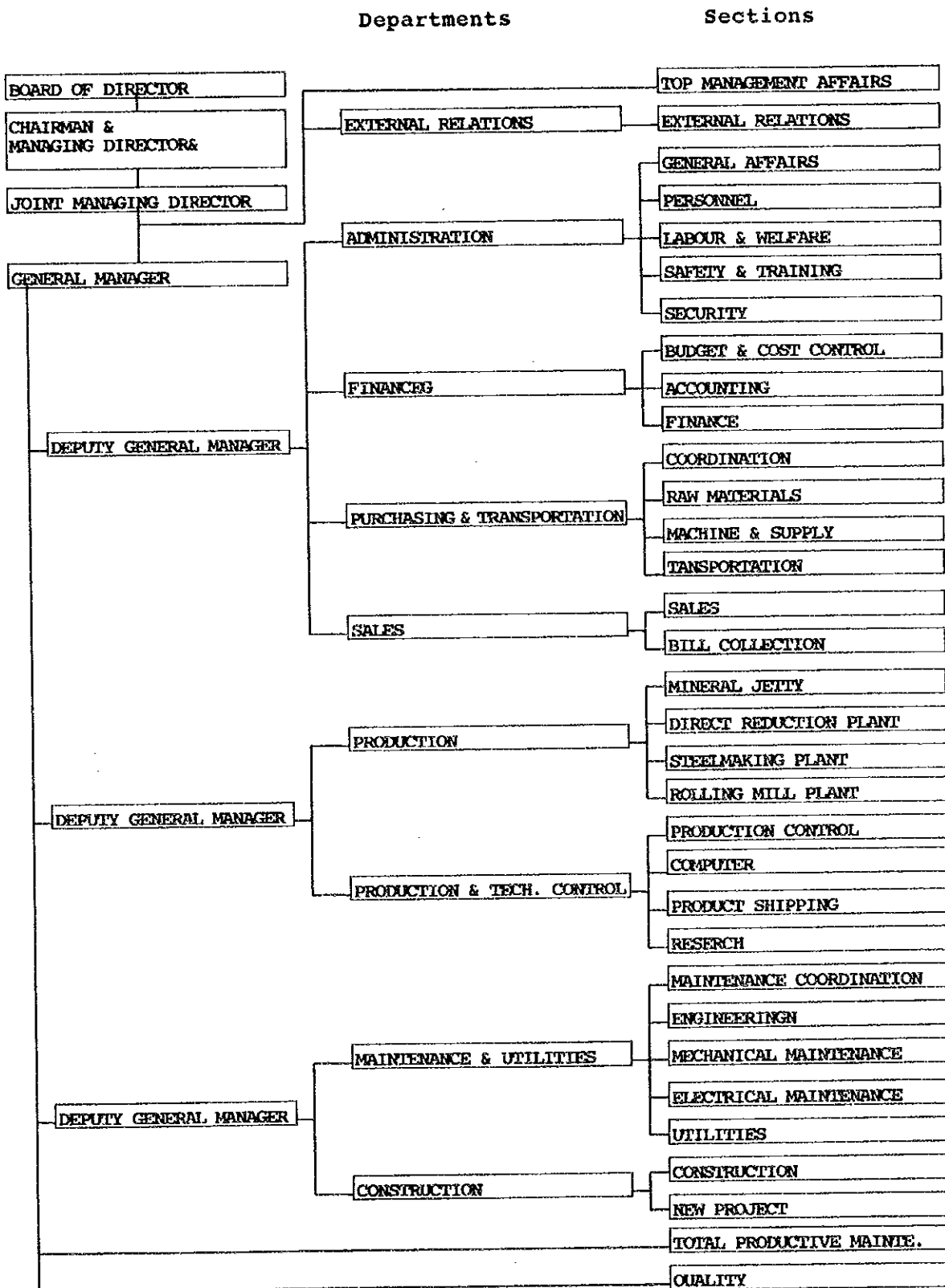
1. インフラが使用出来ること。特に、還元鉄工場の原料である大量の輸入鉄鉱石およびペレット用の港湾、荷揚げ設備。
2. 製鉄所の管理、操業、保全を行なうための人材の存在

さらに ANSDK は、ミニミルは重大な環境問題は先ずは引き起こさないとし、拡張プロジェクトにおいて大気汚染対策として、17 百万 US\$を投じたと述べた。

## 2-1-2 組 織

ANSDK の会長はモハメディン氏で、従業員は 2,600 人である。組織表を図 2A-1-1 に示す。9 部 33 課である。

Fig. 2A-1-1 ANSDK Organization



## 2.2 工場

ANSDK は 2-1-1 項に述べたように拡張プロジェクトを終えたが、完成後の生産設備生産量は次の通りである。

1. 還元鉄工場
  - (1) 還元鉄プラント x 2 基
  - (2) 標準生産量：還元鉄年産 160 万トン
2. 製鋼工場
  - (1) 電気炉 x 4 基  
    レードルファーネス x 2 基  
    ビレット連铸機 x 3 基
  - (2) 標準生産量：溶鋼年産 155 万トン
3. 圧延工場
  - (1) 直棒鋼工場 x 1 連  
    ワイアロッド工場 x 2 連
  - (2) 標準生産能力  
    直棒鋼工場：直棒鋼年産 53 万 1,400 トン  
    ワイラロッド工場：ワイラロッド年産 93 万 9,900 トン  
    合計：年産 147 万 1,300 トン

### 2-3 還元鉄工場

### 2-4 製鋼工場

#### 2-4-1 概要

2-1-1 項に述べたように拡張プロジェクト完成後の製鋼工場主要設備は、70 トン電気炉 4 基、レードルファーネス 2 基、ビレット連铸機 3 基である。電気炉では、還元鉄工場で生産された還元鉄およびスクラップを、石灰工場で生産された石灰及び添加材とともに溶解する。溶鋼は 3 基のビレット連铸機で 130 mm 角、長さ 16 m のビレットに铸込む。このビレットは、2 圧延工場用である。

主要生産設備と生産量を下記の通りである。

- (1) 電気炉 x 4 基  
    レードルファーネス x 2 基  
    ビレット連铸機 x 3 基
- (2) 標準生産量：溶鋼年産 155 万 5,000 トン

#### 2-4-2 生産量

最近5年間の生産量を表2A-1-2に示す。

Table 2A-1-2 Production of SMP in Recent Five Years

Unit: 1,000 t

	1992	1993	1994	1995	1996
Molten steel	1,182	1,265	1,263	1,348	1,235
Billet	1,151	1,228	1,241	1,320	1,214

#### 2-4-3 電気炉の操業データ

1996年の電気炉の月間操業データを表2A-1-3に示す。

Table 2A-1-3 Monthly Operating Parameter for Recent 12 Months for EAF -Steelmaking Plant (SMP)-

Item	1996											
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
<b>A Specification</b>												
1 Nominal capacity (t/ht)	70	70	70	70	70	70	70	70	70	70	70	70
2 Transformer capacity	46	46	46	46	46	46	46	46	46	46	46	46
<b>B Main raw materials</b>												
1 Scrap and pig iron (t/ht)	38,218	37,606	37,810	35,323	35,731	39,192	45,177	38,100	31,638	33,189	21,339	8,318
2 DRI (t/M)	81,266	75,000	73,693	73,874	71,774	70,865	68,225	68,767	72,402	86,046	70,696	54,609
3 HBI (t/M)	10,999	11,317	10,000	13,667	19,000	14,498	15,138	13,005	12,979	10,199	250	0
4 Total charge	130,482	123,923	121,503	122,864	126,505	124,555	128,540	120,872	117,019	129,434	92,285	62,927
5 Ratio of DRI and HBI (%)	73.3	69.5	68.9	71.3	71.7	68.6	64.8	67.6	73.0	74.6	76.8	86.8
<b>C Products</b>												
1 Molten steel (t/ht)	81.5	81.1	81.4	81.3	79.5	80.2	79.8	80.4	80.4	80.6	81.0	80.9
2 Molten steel (t/M)	115,097	109,503	108,365	109,403	110,567	109,180	112,021	106,781	103,103	113,271	82,270	55,642
<b>D Production Parameter</b>												
1 Heat/day (ht/d,F'ce)	12.95	12.85	12.49	12.42	12.45	12.69	12.86	12.75	12.67	12.94	13.16	13.06
2 Tap-to-tap time (min/ht)	111.2	112.1	115.3	115.9	115.7	113.5	112.0	112.9	113.6	111.3	109.4	110.3
3 Steel yield (%)	88.2	88.4	89.2	89.1	87.4	87.7	87.2	88.3	88.1	87.5	89.2	88.4
<b>E Auxiliary raw materials</b>												
1 Burnt lime (kg/t-BT)	38.3	38.4	37.5	36.4	41.4	38.8	38.6	39.5	40.7	37.3	39.7	37.2



Table 2A-1-3 Monthly Operating Parameter for Recent 12 Months for EAF -Steelmaking Plant (SMP)-

Item	1996 Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
F Utilities												
1 Electric power for EAF (kWh/t-MS)	613	607	620	641	648	622	623	622	621	621	617	660
2 Oxygen gas (Nm <sup>3</sup> /t-MS)	14.7	13.8	7.7	2.9	4.5	10.5	13.2	10.6	13.3	12.7	12.7	16.9
G Electrode and refractories												
1 Electrode (kg/t-MS)	3.50	3.49	3.47	3.45	3.52	3.65	3.89	3.71	3.66	3.71	3.66	3.71
2 Brick (kg/t-MS)	4.72	4.27	4.82	4.80	4.27	4.77	4.73	4.73	4.74	5.00	5.2	4.69
3 Gunning materials (kg/t-MS)	9.5	9.5	7.9	7.9	8.7	8.6	8.8	8.7	9.0	6.4	5.2	5.7
H By-products												
1 Slag (kg/t-MS)	146	141	125	121	135	128	125	131	149	122	184	233
2 Dust (kg/t-MS)	15.8	11.3	10.7	15.4	11.4	18.7	20.9	21.5	18.8	18.0	18.3	23.4

## 2-5 圧延工場

圧延工場には二つの工場があり、一つは鉄筋用棒鋼、もう一つはワイアロッドの生産で、拡張プロジェクト後の年間生産能力は、それぞれ 53 万 1,400 トン、93 万 9,900 トンである。

## 3. ヘルワン製鉄所

### 3-1 ヘルワン製鉄所の概要

ヘルワン製鉄所は、1954 年に設立されたエジプトにおける最初の、そして唯一の一貫製鉄所であり、薄板はここだけで生産されている。製鉄所はカイロの南方 30 km ヘルワンの近くのエル・テビン (El Tebbin) にあり、高炉-転炉-連続鑄造機-圧延設備の製造プロセスで、薄板、構造用鋼、鉄筋棒鋼を製造している。会長はアリ・ヘルミ氏で製鉄所の従業員は約 1 万 5,000 人である。

当初の製鉄所は、ドイツの会社デマグにより完成され、1958 年その技術協力により操業に入った。後にロシアの技術と資金により粗鋼生産能力 120 万トンの拡張が計画された。これはバハリア (Baharya) の低磷鉱石を使用することをベースにして、拡張は 2 段階に分けて達成された。

当初の製鉄所は、1958 年と 1960 年に建設され、焼結 2 基、高炉 2 基、トーマス転炉 4 基 (当初より稼働せず)、電気炉 2 基および分塊 1 基、大形形鋼ミル、厚板ミルなどの圧延設備であった。その後数次にわたり、各設備の新設増設を重ね生産能力を拡張している。

### 3-2 工場設備

主要生産設備と生産能力を下記に示す。ヘルワン製鉄所はまた、鉱山および採掘所即ち、エル・ゲディダ (El Gedida) 鉱山、ベニ・ハリド (Beni-Khalid) 石灰石採掘所、アダビア (Adabia) ドロマイト採掘所を所有している。

#### (1) 製鉄工場

- |         |   |
|---------|---|
| 1) 焼結設備 | 50 m <sup>3</sup> x 2 基<br>75 m <sup>3</sup> x 5 基                    |
| 2) 高炉   | 575 m <sup>3</sup> x 2 基 (デマグ製)<br>1,033 m <sup>3</sup> x 2 基 (ロシア設計) |

## (2) 製鋼工場

現在の生産は、主に転炉である。

- |           |           |
|-----------|-----------|
| 1) 電気炉    | 12トンx2基   |
|           | 80トンx3基   |
| 2) スラブ連続機 | 2ストランドx3基 |
|           | 1ストランドx1基 |
| ビレット連続機   | 6ストランドx3基 |

## (3) 圧延工場

### 1) 900分塊ミル

この分塊ミルの均熱炉には、3-4トン鋼塊を装入し、また、スラブの圧延も行ない、大形形鋼用の140mmから225mm角のブルームにする。また、1,800厚板ミルの80-170mm厚みx最大巾500mmのスラブにも圧延する。

### 2) 大形形鋼ミル

主に一般の形鋼である構造用形鋼を製造する。材料は、900分塊で圧延したブルームおよび連続鑄造ビレットであり、プッシュタイプの加熱炉（時間当り40トンの能力）を通して圧延ラインに供給される。精製ラインには、熱間および冷間の切断機、ウォーキングタイプの冷却床、オンライン直延機がある。

### 3) 中形鋼ミル

棒鋼、構造用形鋼、磨き棒鋼を製造する。8スタンドの半連続式で、プッシュタイプの加熱炉（時間当り50トンの能力）精製ラインは、大形形鋼ミルと同じで、オフライン直延機である。

### 4) 小形形鋼およびワイヤロッドミル

連続鑄造ビレットおよび750大形形鋼ミルの圧延ビレットから、小形形鋼およびワイヤロッドを製造する。

### 5) 1800厚板ミル

連続鑄造スラブから8-100mm厚みx最大巾1,500mmの厚板を製造する。

### 6) ホットストリップミル

1,200半連続式ホットストリップミルで2-8mm厚み、500-1,050mm巾、最大重量7トンのホットコイルを製造している。スラブ厚みは150-200mm、最大重

量は7トンである。

7) 酸洗ライン

8) コールドストリップミル

1,200 ホットストリップミルからのホットコイル、および熱延スリットコイルまたは熱延鋼板を材料として、冷延製品を製造する。

9) 精製設備

電解清浄ライン

焼鈍炉 x 27 基

テンパーミル

スリットライン x 2 基

シアライン x 2 基

ホットコイル用シア、スリット兼用ライン

波板成形機

溶融亜鉛めっきライン

溶融錫めっきライン x 6 基

冷間成形機

**Appendix 3A-1 FLAT PRODUCT CONSUMING COMPANIES**



Appendix 3A-1 FLAT PRODUCT CONSUMING COMPANIES

Category of Products	No.	Manufacturer	Location	Capacity of production
Steel Flat (General)	1	STEELCO	Cairo	
	2	METALCO	Cairo	
	3	FERROMETALCO	Cairo	
	4	ERISCOM	Cairo	
		PETROJET	Cairo	
		ARAB CONTRACTORS AGIBA	Cairo	
Ships	5	Port Said Engineering Works Co.	Ramadan city & Port said	
	6	HIMEC		
	1	Alexandria Shipyard	Alexandria	
	2	Egyptian Shipbuilding & Ships Repairing Co.	Alexandria	
	3	General Egyptian Workshops Co.	Cairo	
	4	Port Said Shipyard	Port said	
Steel Pipes	5	Port Tawfik Shipyard	Suez	
	6	Suez Shipyard	Suez	
	7	TIMSAH Shipbuilding Co.	Ismailia	
	8	Port Said Engineering Works Co.	Ramadan city & Port said	
	9	Canal Naval Construction Co.		
	1	Nasr Pipes	Cairo	
Home Appliances	2	Light Transport	Cairo	
	3	International for steel	Cairo	
	4	Acro Misr	Cairo	
	5	Arab German Lighting	Cairo	
	6	Elimaco	Cairo	
	7	Hoze metal		
	1	Alexandria for Metallic Products	Alexandria	
	2	360 Military Factory	Cairo	
	3	Appliances Factory (Factory No.306)	Cairo	
	4	Gas Ovens Factory (ATLAS)	Cairo	
	5	Industrial Ujon Factory	Cairo & Ramadan city	

Category of Products	No.	Manufacturer	Location	Capacity of production
Home Appliances	6	GMC	Cairo & October city	
	7	Techno Gas (EASTERN)	Ramadan city	
	8	Fresh	Ramadan city	
	9	Thomas of Household appliances & furnitures	Ramadan city	
	10	Prince for Home Appliances		
	11	Engineering Manufacturing Co.		
	12	Gohar of Metallic Industries	Ramadan city	
	13	Universal Co.	October city	
	14	Fager for Gas Ovens Manufacturing	Alexandria	
	15	Amoun for Gas Ovens Manufacturing	Alexandria	
	16	Aman for Gas Ovens Manufacturing	Alexandria	
	17	KIRIAZI for Engineering industries	Ramadan city	
	18	PHILIPSE	Alexandria	
	19	IDEAL	Cairo	
	20	Koldair	Cairo	
	21	Kojec	Alexandria	
	22	Tako Electric	Cairo	
	23	SILITAL	Ramadan city	
	24	EBERNA	Abu Rawash(GIZA)	
	25	ALASKA	Ramadan city	
	26	Majestic	Ramadan city	
	27	ELECTROSTAR	October city	
	28	SUPER BOSCH	Ab Rawash(Giza)	
	29	Sohage for Cooling industries	Sohag city(Upper Egypt)	
	30	Shafieh Sons	Sohag city(Upper Egypt)	
	31	OLYMBIC	Cairo & Ramanan city	
	32	EXPRESS	Alexandria	
	33	Nour	Cairo	
	34	Itehad	Qalyubiya	
	35	Egyptian Co. for Cooling		
	36	El Nasr Co. for Cooling	Giza	
	37	Power	Ramadan cuty	
	38	MIRACO	Ab Rawash(Giza)	
	39	International		
	40	DRICK		



Category of Products	No.	Manufacturer	Location	Capacity of production
Automobiles	1	El-Nasr Automobile Manufacturing Co.(NASCO)	Cairo	
	2	The Egyptian Company for manufacturing Light Transport Vehicles	Helwan	
	3	Ghabbour	Qalyubiya	
	4	General Motors Egypt	October city	
	5	Suzuki Egypt		
	6	Prima for Engineering Industries	Ab Rawash(Giza)	
	7	Egyptian Company for Autoindustries(JAC)	Bilbeis(Sharqiya)	
	8	Arab American Vehicles Company(AAV)	Cairo	
	9	Peugeot Egypt	same as AAV	
	10	Egypt Company for Engineering & Tools(Miecar)	Cairo	
	11	Misr Company for Trailer Manufacturing(Abaza-Langendorf)	Cairo	
	12	Gorica Misr Group	Ramadan city	
	13	Helwan Transport Preparations	Helwan(Cairo) & October city	
	14	MCV Egypt	Ismailia	
	15	International Manufacturing Company (Hassan Yousif)	Ramadan city	
Food Cans	1	El-Nasr Canned Food(Kaha)	Kaha( )	
	2	Edfina	Alexandria	
	3	Alexandria Oil & Soap	Alexandria	
	4	Egypt for Oil & Soap	Cairo	
	5	Egyptian Salt & Soda	Alexandria	
	6	El-Nile Oil & Detergents	Cairo	
	7	Tanta Oil & Soap	Tanta(Qalyubiya)	
	8	Extracted Oil	Alexandria	
	9	Cairo Oil & Soap	Cairo	
	10	Misr Dairy Food & Stuffs	Cairo	
Metal Furniture	1	Industrial Delta(IDIAL)	Cairo	
	2	Metal Furnitures for Houses & Offices(MO/HM)	Qalyubiya	
	3	El Entriar Factory for Metallic Furniture	Giza	
	4	Talat for Manufacturing of Washes & Metallic Furnitures	Cairo	
	5	Islamic Co. for Engineering Preparations	Cairo	
	6	Kontinenter-International for Manufacturing & Investment	Cairo	
	7	Mobica	Ab Rawash(Giza)	

Category of Products	No.	Manufacturer	Location	Capacity of production
Boiler, Pressure Vessels, Heat Exchanger	1	Babcock(Wilcox S.A.E.)	Giza	
Railway Vehicle	1	The General Egyptian Company for Railway Wagon & Cosche (SEMAF)	Helwan(Cairo)	
Gas Bottles	1	Union-Co. for Gas Bottles Manufacturing & Metal Processing	Ramadan city	
Metal Container	1	The Naval Constructions Co.	Port said	
Construction (Corrugated sheets)	1	Egyptian Italian Co.	10 th of Ramadan city	
	2	ALPHAMETAL	10 th of Ramadan city	

## JICA DAILY REPORT

DATE:	Mar. 05, 1997	TIME:	AM 10:10 - 11:00
GOFI MEMBERS:	Eng. Youssef Al Hassan Ahmed	JICA MEMBERS:	Y. Ise H. Kanemoto
PLACE OF VISIT	EGITALEC (Egyptian Italian Engineering & Construction Joint Stock Co.)		
ATTENDANTS	Dr. Eng. Attef Youssef Mahmoud (Studies Department Manager)		
CONTENTS	<p>1) explained of the activities by JICA 2nd survey team.</p> <p>2) Discussion about questionnaire</p> <ul style="list-style-type: none"> <li>* handed over the questionnaire again.</li> <li>* EGITALEC responded they felt the questionnaire was too detailed.</li> <li>* EGITALEC will respond if they can respond to the questionnaire after consulting with GOFI.</li> <li>* Next meeting will be expected on Mar. 08 (Sat.) or Mar. 15 (Sat.).</li> </ul> <p>3) Discussion about Steel flat products market</p> <ul style="list-style-type: none"> <li>* EGITALEC forecasts that cold rolled products market will occupy 40% of flat products one in the near future.</li> <li>* EGITALEC advised the use of galvanizing products could be found by asking to the holding company.</li> <li>* The range of products size should be decided by survey team because at present flat products users are forced to use available size of materials only in Egypt.</li> <li>* The reason EISCO's ETL &amp; Galvanizing equipment are not in use now is due to their poor quality and the size of market.</li> </ul>		
RECEIVED DOCUMENTS	* None		
ITEMS TO BE FOLLOWED	* to follow with GOFI when they can have a meeting with us.		
ITEMS TO BE DISCUSSED WITH MEMBERS	* None		

## JICA DAILY REPORT

DATE:	Mar.05,1997	TIME:	PM 14:00 - 15:30
GOFI MEMBERS:	Eng.Youssef Al Hassan Ahmed Mr. Alaa Din Wali	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	EBA(Egyptian Businessmen's Association)		
ATTENDANTS	Taher El Sherif(Secretary General)		
CONTENTS	<p>1) explained of the activities by JICA 2nd survey team.</p> <p>2) Discussion about questionnaire</p> <ul style="list-style-type: none"> <li>* Location for each company can be responded.</li> <li>* With regard to "outline" it is satisfactory if production capacity of each company is available.</li> <li>* Other detailed information may be difficult to collect.</li> <li>* will reply to the questionnaire in ten days.</li> </ul> <p>3) Opinion on site selection [Priority to select the site]</p> <ol style="list-style-type: none"> <li>(1) Infrastructure</li> <li>(2) Approach to market</li> <li>(3) Cost of construction</li> <li>(4) Environmental condition(As the power against pollution becomes very strong recently, this item might be prioritized most.)</li> </ol> <p>[Suez]</p> <ul style="list-style-type: none"> <li>* Most attractive place among three candidates</li> <li>* Close to market(Most industrialized cities such as 10th Ramadan, 6th October etc.)</li> <li>* There are free zones.(Tax free area)</li> <li>* Price of land; US\$4/m2</li> </ul> <p>[Alexandria]</p> <ul style="list-style-type: none"> <li>* inferior to Suez concerning land price, environment and natural gas</li> <li>* As the area along seaside is nominated to tourism area steel making industry will not be welcome.</li> </ul> <p>[Safaga]</p> <ul style="list-style-type: none"> <li>* No way to select because at present infrastructure is quite poor.</li> <li>* As the area along seaside is nominated to tourism area steel making industry will not be welcome.</li> </ul> <p>4) 'Buy -Egyptian' campaign</p> <ul style="list-style-type: none"> <li>* Automobile---from 40% to 60% in 6 years</li> <li>* Home appliances---more advanced.</li> </ul>		
RECEIVED DOCUMENTS	<ul style="list-style-type: none"> <li>* Brochure on EBA</li> <li>* Brochure on Area development</li> </ul>		
ITEMS TO BE FOLLOWED	* to confirm of the day to receive the response to questionnaire.		
ITEMS TO BE DISCUSSED WITH MEMBERS	* none		

## JICA DAILY REPORT

DATE:	Mar.06,1997(Thu)	TIME:	AM 10:20-11:30
GOFI MEMBERS:	Eng. Aly Hassan	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	MOHM(Modern Office & House Metal Furniture) to have visited a Factory for Metal Furniture(located in QALYUBIYA)		
ATTENDANTS	Amin Sultan Amin(Factory Manager)		
CONTENTS	<p>1) Outline of the company Established year; 1974 No of employees; about 1100 consisting of 3 companies(Furniture, Metal pipe &amp; Grating)</p> <p>2) Consumption of steel flat products Cold rolled coils; 12,000ton/y, Thickness(0.5-2.0mm), Width(1000-1250) first quality Galvanized coils; 500ton/y, Thickness(0.3-0.8mm), Width(1250Max.)</p> <p>3) Unit weight of purchasing steel flat products; 3 - 5 tons</p> <p>4) Rate of imported material; 80% (Material is imported from all over the wo not limited.)</p> <p>5) Reason for importing; Domestic steel has a quality problem because of too high carbon contents.</p> <p>6) Forecast on production expansion; 10% increase yearly</p> <p>7) Spec of steel flat material; JIS SPCC SD, dull finished</p> <p>8) Price of steel flat products [Imported] Cold rolled; 400 US\$/ton(C&amp;F) + 150 US\$(?)(Tax + Transportation fee) Hot rolled; 280 US\$/ton(C&amp;F) + Tax + Transportation fee Galvanizing; 600 US\$/ton(C&amp;F) + Tax + Transportation fee (Additional fee is estimated as 30% of C&amp;F.) [EISCO products] Cold rolled; 500 US\$/ton Hot rolled; 350 US\$/ton</p> <p>9) Quality of steel flat material at site A lot of rusted cut sheets were found at site.(They excused because it will be pickled before electrostatic powder painting but in fact after painting some burst surfaces were found.) Only simple bending forming is necessary in process. Many dents were found on the surface of completed furniture.</p> <p>10) Galvanizing material is mainly formed to expanded sheets for construction use.</p>		
RECEIVED DOCUMENTS	* Brochures on products (Metal furniture, Metal pipings and Gratings)		
ITEMS TO BE FOLLOWED	* Requested to send JIS regarding Iron steel & alloy.		
ITEMS TO BE DISCUSSED WITH MEMBERS	* None		

## JICA DAILY REPORT

DATE:	Mar.06,1997	TIME:	PM 12:00 - 13:30
GOFI MEMBERS:	Eng. Aly Hassan	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	FMC(FERROMETALCO) located in Cairo		
ATTENDANTS	Mr. Ragaie Marmoush(Procurement Manager)		
CONTENTS	<p>1) Outline of the company Established year; 1986 No of employees; 1,100</p> <p>2) Capacity of plant; 20,000ton/y</p> <p>3) Consumption of steel products; 12,050ton/y Plate; 8,000ton/y, Thickness(6-30mm---70%, &gt;30mm---30%) Width(2500mmMax.) Grade(ST37---90%, ST52---10%) Hot rolled sheets; 600ton/y, mainly Checker plate Pickled sheets &amp; Cold rolled sheets; none Others(shape, angle, I beam, etc.); remainder</p> <p>4) Rate of imported material; 60%(1,500mm-2,500mm wide)</p> <p>5) Reason for importing: The width of domestic steel is limited.(<math>\leq</math> 1500mm) Only the plates more than 1500mm are imported.</p> <p>6) Opinion on the quality of domestic products; very good</p> <p>7) Request to the suppliers * required wider material to save welding cost. * Shape improvement is required for thicker plates ranged 30-80mm thick (The width by shape corrector is limited to less than 1,000mm.) * required larger I beams to save cost. EISCO's current Max sizes are 260mm for shape &amp; 300mm for I beam.</p> <p>8) Price of steel products Imported; 1,600 LE/ton C&amp;F(Port price)---450-600 US\$/ton Transportation cost---10-20 LE/ton EISCO Products; 1,200 LE/ton</p> <p>9) Other information * Products at site; Big I beam, Heat exchanger, Big vessel etc. * Max unit weight of products by FMS; 100 ton * Products for export are shipped from Alexandria harbor. * Many products for ANSDK are under fabricating.</p>		
RECEIVED DOCUMENTS	* None		
ITEMS TO BE FOLLOWED	* None		
ITEMS TO BE DISCUSSED WITH MEMBERS	* None		

## JICA DAILY REPORT

DATE:	Mar.09,1997	TIME:	AM 11:00 - PM 13:30
GOFI MEMBERS:	Eng. Nabil El Saghir	JICA MEMBERS:	H.Kanemoto Y.Ise
PLACE OF VISIT	SUEZ SHIPYARD (affiliated company of Suez Cannel Authority, one of seven companies)		
ATTENDANTS	Eng. Wael S. Kaddour(Chairman) Eng. Helmi Abou El Azm(Docks Director)		
CONTENTS	<p>1) Explained of the activities by JICA second survey team.</p> <p>2) Outline of the company Established year; more than 100 years ago No of employees; 700 Main job; Ship repair &amp; Ship building(Ship building is very few.) Main equipment; Dry dock, Graving dock, Floating dock, machining shop, fabricating shop, forging shop, electrical shop, etc.</p> <p>3) Consumption of steel products; They asked to see the data in phase-1 New bottom; 500ton/y Ship repair; 2,000ton/y Other steel structure; 300ton/y Amount of each products category will be responded to GOFI later.</p> <p>4) Lot weight for purchasing; 3m wide x 9m long, up to 30mm thick, less than 12mm is much(8-10mm most)</p> <p>5) Rate of imported material; will be responded to GOFI by Fax. later.</p> <p>6) Reason for importing; possible size from EISCO is limited.(8 &amp; 10mm)</p> <p>7) Future production plan; There is a plan to increase production by three times along with new joint venture company.</p> <p>8) Price of raw material; advised to ask Alexandria shipyard or Port Said shipyard because they were consuming much more flat products. They emphasized that the construction cost of new flat products must be reduced as much as possible because there were a lot of strong competitors in this field such as Korea, China etc. Info.; EZZ new Project 1st stage(600,000ton/y Bar Mill from billet)---350 mil. LE 2nd stage(ditto )---250 mil. LE</p>		
RECEIVED DOCUMENTS	* Brochure on Suez Shipyard		
ITEMS TO BE FOLLOWED	* to receive the response to questionnaire		
ITEMS TO BE DISCUSSED WITH MEMBERS	* None		

## JICA DAILY REPORT

DATE:	Mar.10,1997	TIME:	PM 12:30 -- 13:50
GOFI MEMBERS:	Eng.Seham El Bahrawy	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	MOBICA(Modern Building Carpentry CO.) Abu Rawash city(GIZA)		
ATTENDANTS	Eng. Mohamed Abdel Kader Salem(Metal Furniture Manager)		
CONTENTS	<p>1) Outline of the company Established year; 1985 No of employees; 200(Metal furniture dep.) fabricating steel cabinets, car sheets, steel desks &amp; chairs, etc.</p> <p>2) Consumption of steel flat products; 70 ton/month Cold rolled coils; Thickness(0.6 &amp; 0.8mm), Width(720mm) Cold rolled sheets; Thickness(0.6 - 2.0mm), 1250mm W x 2500mm L Grade; SPCC, SPCD, SPCE(GM car sheets; ST37 Deep drawing)</p> <p>3) Consumption of steel piping(indirect flat products); 70 ton/month</p> <p>4) Purchasing weight; 2.5 ton Max.(coil) 5-10ton(sheets)</p> <p>5) Rate of imported material; 90%(Flat) (From Japan only Sumitomo Metal is supplying.) (Steel piping material is purchased from local market.)</p> <p>6) Reason for importing; Quality &amp; price * Surface steepness is not equal. * Surface finish is not delicate. * After bending shape is not uniform.</p> <p>7) Market condition Estimated production will be increased by 25% yearly.</p> <p>8) Price of raw material 3,000 LE/ton(including tax &amp; transportation fee) 4,000 LE/ton(from Italian market)</p> <p>9) Quality of steel flat material at site Some rusted cut sheets were found at site. In general quality control was good. There were many processes which required deep drawing quality.</p>		
RECEIVED DOCUMENTS	* none		
ITEMS TO BE FOLLOWED	* none		
ITEMS TO BE DISCUSSED WITH MEMBERS	* none		



## JICA DAILY REPORT

DATE:	Mar.10,1997	TIME:	AM 10:20 - 12:00
GOFI MEMBERS:	Eng. Seham El Bahrawy	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	SUZUKI Egypt located in 6th October city		
ATTENDANTS	Mr. Tarek Metwally(Localization Metallic Manager)		
CONTENTS	<p>1) Outline of the company  Established year; 1989  No of employees; 355  The capital; 50 million LE  Total investment;120 million LE  Share holders; Egyptian(51%), Saudi Arabian(29%), Japanese(20%)  Products; Commercial Vehicles, Passenger cars, 4x4 Vehicles etc.</p> <p>2) Consumption of steel flat products  Not changed from the data by phase-1 survey.  The consumption in each steel category will be answered to GOFI later.  (on Mar.13,1997)  All steel parts are fabricated at other companies and here in SUZUKI  Egypt only assembling and painting are conducted.</p> <p>3) Rate of imported material  Local steel can not be used for SUZUKI products because of quality  problem.(Japanese, German and Italian products have no problem.)  Only small amount of local hot rolled products are acceptable.  [Imported steel parts]  All outer panels for passenger cars &amp; outer panels for truck cabin  are imported from Japan.(Electrical galvanizing material is used for  outer panel for 4x4 Vehicles.)  [Local steel parts](In many cases steel material is imported.)  Wheel holder-----from Helwan company for industrial 99  Fuel tank(Galvanizing)----from Abu Youssef company  Exhaust piping &amp; muffler(galvanizing)----  All sheets members under body----from five local companies  (Helwan factories, Helwan companies, Misrait, Dilco and Body parts  company(Alex.))  Bumper-----  [Local parts rate] Passenger cars; 49%, Commercial cars; 60%  Vitara 4x4; 40%</p> <p>4) Reason for importing; Deep drawing quality products can not be  obtained from local market, and also because of quality problem.</p> <p>5) Price of flat products  1,000 - 1,200 US\$/ton (from Japan)  800 US\$/ton(from Europe)</p>		
RECEIVED DOCUMENTS	* Brochure on a passenger car 'SWIFT' * Brochure on 5-Door Wagon 'VITARA V6 2.0' * Brochure on 'CARRY TRUCK' * Brochure on 'CARRY VAN'		
ITEMS TO BE FOLLOWED	* required to ask GOFI on Mar.13 if received the answer to questionnaire.		
ITEMS TO BE DISCUSSED WITH MEMBERS	* None		

## JICA DAILY REPORT

DATE:	Mar.11,1997	TIME:	AM 10:10 - PM 13:00
GOFI MEMBERS:	Eng. Aly Hassan	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	The Arab Contractors(OSMAN AHMED OSMAN & Co.) (Soubra Branch)		
ATTENDANTS	Eng. Farouk M. Allam(Central Workshops general Manager) Eng. Nasser		
CONTENTS	<p>1) Outline of the company Established year; 1959 Number of employees; 3,000 Three major factories in Egypt(Central factory &amp; two ship yards)</p> <p>2) Consumption of flat products(limited to Shoubra branch) Hot rolled sheets; 15,000 ton/year, 3-60 mm thick, 1,000-2,000mm wide ST52 &amp; ST37</p> <p>3) Rate of imported material; usually 20 % (sometimes more)</p> <p>4) Reason for importing * Thick material can not be obtained from local market. * Width &amp; length are limited.(EISCO Max.1.0m wide x 6-9m long) (required width up to 2.0m, length up to 18m) * Grade ST52 can not be obtained from local market.</p> <p>5) Issues on domestic products * Quality of thicker products is bad. (Quality of only 3 -7 mm thick hot rolled sheets is not bad.) * Thicker products more than 20mm are refused from consultant company. * Errors of thickness are about 10 %. * not delivered on schedule.</p> <p>6) Forecast on production expansion; estimating 15 % yearly.</p> <p>7) Price of steel flat products * 1,500 LE --- from local markets(imported material from Russia, Ukraine, Rumania, etc.) * 1,550 LE --- from EISCO * 350 - 600 US\$ --- from England, German, Austria, etc. (except Tax &amp; Transportation fee, including special materials.)</p> <p>8) Tax; Flat products---20 %, Section products---30 %</p> <p>9) Transportation fee * Factory to ports --- Supplier's cost * Inside Egypt --- User's cost, 15-20 LE/ton(from local market) 50 LE/ton(Port Said - Cairo, Alex. - Cairo)</p> <p>10) Request to local steel market requires yearly 3,000ton of Hot rolled section(large H beam, I beam)</p> <p>11) Quality observation of domestic steel flat products at site * Many ragged gas cut surfaces were found because of blow holes. * Surface of some thick plates were wavy. * Surface condition of some thick plates were terrible.</p>		
RECEIVED DOCUMENTS	* Annual Report 1994/1995 on The Arab Contractors * Prequalification on Central Workshops(A division of Shoubra Branch)		
ITEMS TO BE FOLLOWED	* None		
ITEMS TO BE DISCUSSED WITH MEMBERS	* None		

## JICA DAILY REPORT

DATE:	Mar.16,1997	TIME:	AM 10:20 - PM 12:30
GOFI MEMBERS:	Eng. Aly Hassan	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	IDEAL(DELTA INDUSTRIAL Co.) (Nasr City Factory)		
ATTENDANTS	Eng. Mohamed Salah El-Din(Production Engineering General Manager)		
CONTENTS	<p>1) Outline of the company Established year; 1984 Composed of three factories. Production capacity; 60,000/y(Refrigerator),120,000/y(Washing Machine) licensed from Italian Company. Number of employees; 1000(Nasr city)</p> <p>2) Consumption of flat products(limited to Nasr city factory) Cold rolled sheets; 2,745 ton/year, 0.5-1.5 mm thick, Max.1,000mm wide Galvanizing sheets; 143 ton/year, 1.25 &amp; 1.5mm thick, 1,000mm x 2,000mm</p> <p>3) Lot weight for purchasing; about 2 ton</p> <p>4) Rate of imported material; 80 % * Outer panel of refrigerator &amp; W/Machine; 100 % (imported from Thyssen, Krupp, Voest Alpine etc.) * 100% of Galvanizing sheets are purchased from local market.</p> <p>5) Reason for importing; it was not responded in written note but clearly because of quality.(All, used for outer panel)</p> <p>6) Opinion about future market; very good, increasing 10% yearly.</p> <p>7) Evaluation on current using material; satisfied</p> <p>8) Observation at site * For outer panels of refrigerators &amp; washing machines, good surface quality of cold rolled sheets are used. * For the parts of washing machines which contact detergent, stainless steel sheets are used.(Rotary drum etc.) * Galvanizing sheets are used for the small parts such as electrical items holder. (These parts are formed by bending or pressing, but they were showing very poor zinc adhesion.)</p> <p>9) Others * Inspection on steel flat products material surface is conducted visually after shearing. (By visual inspection 1.5 - 2.0% of sheets are rejected.)</p>		
RECEIVED DOCUMENTS	* Detailed steel flat material list for purchasing		
ITEMS TO BE FOLLOWED	* None		
ITEMS TO BE DISCUSSED WITH MEMBERS	* none		

## JICA DAILY REPORT

DATE:	Mar.17,1997	TIME:	AM 10:10 - 11:40
GOFI MEMBERS:	Eng. IBAHIM ABDEL HAKIM	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	EL-NASR CANNED FOOD(KAHA COMPANY FOR PRESERVED FOODS) (Nasr City Factory)		
ATTENDANTS	Eng. IBAHIM GHAZAL(Chief of Research and Quality Control Center)		
CONTENTS	<p>1) Outline of the company Established year; 1976 Number of employees; 2,500(including 5 affiliated companies) Nasr city factory is the main factory and other 5 are small.) Nasr city factory is making cans and supplying to other ones. Production; 20,000 ton/y(including every products)</p> <p>2) Consumption of flat products Tinplate sheets; 2,500 ton/y, 0.18-0.28mm thick, 515-720 mm wide 50-135 coating weight, bright finished (Consumption was 5,000 ton/y in 1995.)</p> <p>3) Lot weight for purchasing; average about 1 ton</p> <p>4) Rate of imported material; 100% Imported from; Japan(Nippon Steel, Kawasaki Steel) France(Sollac) Brazil(CSN), USA Spain(ECCS)---TFS</p> <p>5) Reason for importing; no companies to supply Tinplates in Egypt.</p> <p>6) Opinion about future market; increasing 10% yearly but as for Tinplate leveling off.</p> <p>7) Evaluation on current using material Other than Japanese products have such issues as hardness, coating heavy oiling.</p> <p>8) Price of Raw Material(Tinplates) approximately 900 US\$ (including tax &amp; transportation fee) Japanese products are more expensive.</p> <p>9) Dramatical drop of Tinplates import after 1992 The data shown in phase-1 book seems to show the amount requested by public sector. Early 1990 there was a competition between public sector and private sector and at a result the share of public sector dropped dramatically.</p> <p>10) Others Coca Cola, Co., Pepsi Cola Co., Beer Co. are consuming a lot of Tinplates or TFS plates.(12,000 ton/y) and so it's better to investigate such companies.</p>		
RECEIVED DOCUMENTS	* None		
ITEMS TO BE FOLLOWED	* None		
ITEMS TO BE DISCUSSED WITH MEMBERS	* None		

## JICA DAILY REPORT

DATE:	June 11,1997	TIME:	AM 10:00 - 11:30
GOFI MEMBERS:	Eng. Youssef El Hassan Ahmed Eng. Seham El Bahrawy	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	EL-NASR STEEL PIPES & FITTINGS CO.		
ATTENDANTS	Eng. Sami A. Ibrahim (Chairman & Managing Dir.) Dr. Eng. Ahmed Abdel Rahim Ali		
CONTENTS	<p>1) Outline of the company  Established year; 1965  No of employees; 3,500  Products; Small diameter ERW pipe ---- 1/2-4 inch, black &amp; galvanized  Middle diameter ERW pipe ---- Max.8 inch for oil pipe  Spiral SAW pipe ---- 6-62 inch for oil  (Max. diameter was changed.)</p> <p>2) Consumption of flat steel products  Hot rolled coils; 110,000 ton/y, Width(Max.1,500mm),  Thickness(2.5 - 12.7mm)</p> <p>3) Unit weight of coils; Max.12 ton</p> <p>4) Rate of importing material;40% from all over the world(except Japan)  Import W&lt;1,020mm----26,000ton, W&gt;1,020mm---6,000ton  Local W&lt;1,020mm---34,000ton, W&gt;1,020mm---26,000ton</p> <p>5) Reason for importing;  Wider material is required.(up to 1,500mm)  The grades upper than X42 can not obtained from local market.  (EISCO seems not to produce from economical reason.)</p> <p>6) Specification of flat steel products;  Commercial grade(X37)---all local products  High grade(X42 - X60)---imported, 30,000 ton</p> <p>7) Price(depending phase-1 report);  Import---45,446 LE  Local ---67,472 LE</p> <p>8) Quality of flat steel material at site;  All hot coils are stored in house.  All coils from has fish tails.</p>		
RECEIVED DOCUMENTS	none		
ITEMS TO BE FOLLOWED	none		
ITEMS TO BE DISCUSSED WITH MEMBERS	none		

## JICA DAILY REPORT

DATE:	June 11,1997	TIME:	AM 11:50 - PM 1:00
GOFI MEMBERS:	Eng. Youssef El Hassan Ahmed Eng. Seham El Bahrawy	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	EL NASR AUTOMOTIVE MANUFACTURING CO.(NASCO)		
ATTENDANTS	Dip. Eng. Ahmed Afifi (Planning & Supply Director) Hamdy Badr (General manager, Foreign Purchasing Dept.)		
CONTENTS	<p>1) Outline of the company Established year; 1959 No of employees; 9,000 workers Products; 3,000 buses/year, 3,000 trucks/year, 13,000 passenger cars/year, 1,000 tractors</p> <p>2) Consumption of flat steel products not changed from the data by phase-1 survey Hot rolled sheets; 3,360ton/y,Width(Max.1,500mm) Cold rolled sheets; 3,350ton/y, Width(Max.1,500mm) Cold rolled coils; 200ton/year for bus body panel, 1.2mmt x 1,000mmw) Galvanized sheets; 80ton/year for exhaust, tanks and fire-fighting system</p> <p>3) Unit weight of purchasing flat steel products; 2 ton(coil &amp; sheet)</p> <p>4) Rate of imported material; 75% from Europe(Krupp hoesh, Thyssen etc.)</p> <p>5) Reason for importing; Wider material can not be gained from local market.</p> <p>6) Forecast on production expansion; 25% increase by 5 years</p> <p>7) Spec of flat steel products Hot rolled products; ST52 for frame &amp; cross members, ST44, ST37 Cold rolled products; ST14, ST12 Body panels are fabricated by only simple bending and so deep drawing quality will not be required.</p> <p>8) Complaint against current raw material; none</p> <p>9) Quality of flat steel material at site (for bus &amp; truck only); Cold rolled sheets are stocked in warehouse for two year consumption and unpacked except using one. There were serious temper-colored portions at both sides of strip and also rust on the surface but they said it did not matter because phosphating treatment was executed before painting. Hot roll sheets are piled outside and all of them much rusted.</p> <p>10) Outer panels for passenger cars are stamped, pressed and imported.</p>		
RECEIVED DOCUMENTS	none		
ITEMS TO BE FOLLOWED	none		
ITEMS TO BE DISCUSSED WITH MEMBERS	none		

## JICA DAILY REPORT

DATE:	June 12,1997	TIME:	AM 11:30 - PM 1:15
GOFI MEMBERS:	Eng. Iman Fathy	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	EGYPTIAN ITALIAN CO.(10 th of October city) KANDEEL STEEL CO.(next to EGYPTIAN ITALIAN CO.)		
ATTENDANTS	Eng. Amin A. Zanati		
CONTENTS	<p>1) Outline of the company  Established year; 1992  Egyptian Italian Co. &amp; Kandeel Steel Co. are belonging to Kandeel group and both companies are affiliated to each other.  Number of employees(Egyptian Italian Co.); 150  Products of Egyptian Italian; Corrugated sheets for roof &amp; wall  (galvanized &amp; color,0.5-1.25mmtx1,250mmW)  Section pipe,Square pipe etc.(hot rolled)  Steel structure(hot rolled)  (Equipment;two roll forming machines, punching machine, shear sandwich machine etc.)  Products of Kandeel; Small diameter ERW pipe (1-5 inch)  Slit coils(hot rolled, cold rolled, galvanized)  Cut sheets(cold rolled, galvanized, color coated)  (Equipment:*one tubing mill,  *one slitting line(0.25-3.5)mmtx(23-1,500)mmW  coil weight; Max.11ton  capacity; actual production 50t/day(1,500t/M)  *one shear line(0.3-2.0)mmtx(300-1,500)mmWx(300-6,000)mmL  coil weight; Max.11ton  capacity;70-40t/day(1,500t/M))</p> <p>2) Consumption of flat steel products  hot rolled coil; 10,000 ton/y  cold rolled coil; 15,000 ton/y  hot dip galvanized coil; 25,000 ton/y  color coated coil; 10,000 ton/y</p> <p>3) Weight of one coil or one package; Max.11 ton</p> <p>4) Rate of imported material  galvanized &amp; color coated; 100%</p>		
RECEIVED DOCUMENTS	none		
ITEMS TO BE FOLLOWED	none		
ITEMS TO BE DISCUSSED WITH MEMBERS	none		

## JICA DAILY REPORT

DATE:	June 12,1997	TIME:	PM 1:30 - 2:30
GOFI MEMBERS:	Eng.Iman Fathy	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	ALPHAMETAL		
ATTENDANTS	Eng.Yehya Zaki (Foreman)		
CONTENTS	<p>1) Outline of the company  Established year; 1980  Number of employees; 150  Products; Steel structure  Corrugated sheets for roof, wall and deck(300 ton/M)  Equipment; one roll forming line, one press forming equipment</p> <p>2) Consumption of flat steel products;  (Regarding hot rolled products, omitted from investigation.)  Galvanized coils; Ave. 100 ton/M, Width(Max.1,300mm)  Thickness(0.55 - 1.1mm for deck),  (0.3 - 1.0mm for roof &amp; wall)  Color coated coils; Ave. 200 ton/M, Thickness(0.3-1.0mm),  Width(Max.1,300mm)</p> <p>3) Weight of one coil or one package; Max.5 ton(coil)</p> <p>4) Rate of imported material; 100% from mainly Germany, and France, Italy, Ukraine</p> <p>5) Reason for importing;  can not be obtained from local market.</p> <p>6) Price of the products  Galvanized corrugated sheet; 18 LE/m  Color coated corrugated sheet; 25 LE/m</p>		
RECEIVED DOCUMENTS	* Company brochure		
ITEMS TO BE FOLLOWED	none		
ITEMS TO BE DISCUSSED WITH MEMBERS	none		



## JICA DAILY REPORT

DATE:	June 14, 1997	TIME:	
GOFI MEMBERS:	Eng. Ibrahim Abd El Hakim	JICA MEMBERS:	Y.Ise H.Kanemoto
PLACE OF VISIT	The Edfina Co. for Preserved Foods (Alexandria)		
ATTENDANTS	Chairman Ibrahim Ahmed Abdo Eng. Moustafa Kamel		
CONTENTS	<p>1) Outline of the company  Established year: 1972  No. of employees: 185  Production capacity: 90 millions/year  Annual production: 65 millions/year  The Edfina Co. for Preserved Foods is one of Edfina family companies and the largest one. This company is producing frozen vegetable, juice jam tomato paste, canned vegetable, beans etc.  Glass bottles occupy the majority of the products and glass bottles are minor. The scale is larger than KAHA.  Other factory locations are;  Port Said x two factories  Laminetta x one factory  Alexandria x two factories</p> <p>2) Equipment  Can welding line x 3, Easy open cap line x 3, Cap making line x 3  Shearing line x 3  Edfina is the only one company that is applying to powder painting inside cans. The powder painted products are delivered to some small private can companies.</p> <p>3) Consumption of flat steel products  TIN sheets; 2,600 ton/y, Thickness(0.18-0.20mm), Width(730-760mm), Primary quality  TFS sheets; 1,400 ton/y, Thickness(0.19-0.21mm), Width(875-750mm), Primary quality</p> <p>4) Rate of imported material; 100%  (from Japan, France, Italy, Brazil, etc.)</p> <p>5) Complaints against supplier; no complaints, satisfied</p> <p>6) Price of raw material; US\$ 1,000 - US\$ 890</p> <p>7) Storage of raw material  stored outside</p> <p>8) Opinion about future market  This company is about to shifting to private sector and so it's difficult to guess at this moment. Anyhow no expansion plan.</p>		
RECEIVED DOCUMENTS	none		
ITEMS TO BE FOLLOWED	none		
ITEMS TO BE DISCUSSED WITH MEMBERS	none		

## JICA DAILY REPORT

DATE:	June 14,1997	TIME:									
GOFI MEMBERS:	Eng. IBRAHIM ABD EL HAKIM	JICA MEMBERS:	Y.Ise H.Kanemoto								
PLACE OF VISIT	Tinplate Committee Chairman Office(Alexandria)										
ATTENDANTS	Senator Abdel E. El Samahy(Chairman of Tinplate Committee)										
CONTENTS	<p>Senator Abdel has the following three roles</p> <ul style="list-style-type: none"> <li>* Chairman of Tinplate Committee</li> <li>* Chairman of Starch Yeast &amp; Detergents Co.(Alexandria)</li> <li>* Vice president of Egyptian Food Industry Chamber</li> </ul> <ol style="list-style-type: none"> <li>1. The reason why tinplate consumption is decreasing <ol style="list-style-type: none"> <li>1) The consumption by military, army &amp; navy is decreasing.</li> <li>2) The consumption of tinplate is substituted with glass and that of glass is increasing.</li> <li>3) Investment for glass container is cheaper than TIN &amp; TFS can.</li> </ol> </li> <li>2. The consumption rate glass vs. tinplate is 90% vs. 10%.</li> <li>3. In the future also glass, paper and plastic containers will occupy the majority because they are more cost-effective than glass containers even if taking manufacturing plant into consideration.</li> <li>4. At present tinplate consumption by oil can is most among food can, oil can and milk can, but gradually it will be substituted with plastic container.</li> <li>5. Milk can will be gradually substituted with paper container.</li> <li>6. Yearly tinplate consumption The numbers for 1993 - 1996 shown in the table "IMPORT OF TINPLATES"(page 2-20 in Phase-1 Report) seem a little small. The guess is as follows. <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Processed Food companies(Kaha &amp; Edfina)</td> <td>9,000 ton/year</td> </tr> <tr> <td>Oil companies(7 major ones)</td> <td>35,000 ton/year</td> </tr> <tr> <td>Private sectors(Coca-Cola, Pepsi, etc.)</td> <td>16,000 ton/year</td> </tr> <tr> <td style="text-align: right;">Total</td> <td>60,000 ton/year</td> </tr> </table> </li> </ol>			Processed Food companies(Kaha & Edfina)	9,000 ton/year	Oil companies(7 major ones)	35,000 ton/year	Private sectors(Coca-Cola, Pepsi, etc.)	16,000 ton/year	Total	60,000 ton/year
Processed Food companies(Kaha & Edfina)	9,000 ton/year										
Oil companies(7 major ones)	35,000 ton/year										
Private sectors(Coca-Cola, Pepsi, etc.)	16,000 ton/year										
Total	60,000 ton/year										
RECEIVED DOCUMENTS	none										
ITEMS TO BE FOLLOWED	none										
ITEMS TO BE DISCUSSED WITH MEMBERS	none										

## JICA DAILY REPORT

DATE:	June 15, 1997	TIME:	AM 10:30 -
GOFI MEMBERS:	Eng. Aly Hassan	JICA MEMBERS:	Y. Ise H. Kanemoto
PLACE OF VISIT	Engineering Company for Exhaust System (6th October city)		
ATTENDANTS	Eng. Eweis Mohamed Hassan (Production Manager) Hassan Ahd. El Pattah		
CONTENTS	<p>1) Outline of the company  Established year: 1987  Number of employees: 150  Products: Exhaust system (consisting of muffler &amp; exhaust pipe) for Mitsubishi, Suzuki, Nissan, GM, Mercedes, etc.  Other small parts for automobile  Production capacity: 80 complete exhaust system / day</p> <p>2) Equipment  Press, Shear, Sawing machine, Bending machine, Forming machine, Welder etc. &amp; painting equipment</p> <p>3) Consumption of flat steel products  Aluminized sheet (120g/m<sup>2</sup>); Thickness (0.6, 1.25, 1.5mm) imported  Galvanized sheet; Thickness (0.6, 1.25, 1.5mm) used for side step of truck imported from England, Germany, etc.  Ni-Zn coated sheet; used for side support of passenger car imported from Japan  Cold rolled sheet; Thickness (1.0, 1.25, 1.5, 2, 2.5, 3, 4mm) after fabricated, painted purchased St37 from local market Deep drawing quality---imported  Hot rolled sheet; Thickness (6.0, 8.0, 10, 12mm) purchased from local market  Aluminized pipe; imported  Black pipe; from local market</p> <p>4) Sheet size; 1m x 2m (standard), 1m x 3m, 1.25m x 2.5m  5) Purchasing sheet lot weight; Max. 3 ton</p>		
RECEIVED DOCUMENTS	* List of Machines		
ITEMS TO BE FOLLOWED	none		
ITEMS TO BE DISCUSSED WITH MEMBERS	none		

## JICA DAILY REPORT

DATE:	June 17,1997	TIME:	AM 9:55 - 11:30
GOFI MEMBERS:	Eng.Garal Mr.Kudo	JICA MEMBERS:	Mr.Otani,Mr.Kawakami,Ise Mr.Kanemoto,Mr.Okamoto
PLACE OF VISIT	Hitachi Plant Engineering & Construction Co.,Ltd.(Alexandria)		
ATTENDANTS	Mr.Kobayashi(General Manager), Mr.Oda(Engineer) Mr.Fujiwara(Sales dept.)		
CONTENTS	<p>1. Outline of HTC Plant Co.  Organization: Alexandria Branch  Industrial Plants Machinery Plants Division  Power &amp; Industrial Group  Head office (Tokyo Japan)  Number of employees: 2,300 in Japan  In Alexandria office there are ten Japanese and sixty Philippine.  The number of workers is 1,200-1,300 and they are Egyptian.  Among them 200 are permanent workers and they conduct key point jobs.  Another 1,000 are temporary worker.(now under second expansion)  Actual construction work data  HPC has conducted jobs in Egypt since 1983.)</p> <p>2. Procedure to collect workers  to impose a personal interview and field work test to adopt from local market.</p> <p>3. Supporting Industries  Since there are no supporting industries around ANSDK, they are doing with import or fabricating/repairing within ANSDK.  The followings are checked items.  * Local construction of casting such as chock, roll, mill housing, gear, wheel  * Machinery industry  * Electrical parts(motor overhaul, controller, etc.)  * Refractory  * Welding &amp; coating  * Bearing</p>		
RECEIVED DOCUMENTS	* Annual Report * Performance Record		
ITEMS TO BE FOLLOWED	none		
ITEMS TO BE DISCUSSED WITH MEMBERS	none		

**Appendix 3A-2 INFORMATION OF CONSTRUCTION COMPANIES**



## **Appendix 3A-2**

### **INFORMATION ON CONSTRUCTION COMPANIES**

1. The Arab Contractors Osman Ahmed Osman & Co.
2. Misr Raymond Foundations
3. El Nasr Building & Construction Co.(EGYCO)
4. Arab Organization for Industrialization (AIO)
5. Alexandria Shipyard
6. Ferrometalco (FMC)
7. The Egyptian Co. for Refractories
8. National Organization for Portable Water and Sanitary Drainage (NOPWSD)
9. General Authority for Investment and Free Zones (GAFI)
10. Alexandria Governorate
11. Holding Companies for Metallurgical Industries

PLACE OF VISIT	The Arab Contractors Osman Ahmed Osman & Co.		
DATE	Aug.27.1997	TIME	10:00-12:30
GOFI MEMBERS	Mrs. Samira Ghobrial	JICA MEMBERS	Otani, Kawakami, Okamoto, Suenaga
ATTENDANTS	Mr. Shehab Eldin Ibrahim(G.Manager,Deputy Director) Mr. Farouk M Allam(G.Manager,Central Workshops) Mr. Ahmed Hemeid(Engineer)		
CONTENTS	<p>1.Handover of questionnaire and request of the answers on;</p> <p>a.Estimates of construction unit price(work and material)for civil &amp; structural work</p> <p>b.Installation cost(per/unit) of mechanical &amp; electrical equipment and refractory</p> <p>2.Clarification of the scope of supply and estimation Basis</p> <p>3.Further study &amp; completion of the answers by the company by Aug.31'97.</p> <p>4.Installation cost estimation of;</p> <p>Mechanical; Approx. 460 \$/t</p> <p>Electrical; Approx. 730 \$/t</p> <p>Refractory; Approx. 170 \$/t</p> <p>5.Unit price of N<sub>2</sub> &amp; O<sub>2</sub> (Additional question)</p>		
RECEIVED DOCUMENTS	Company's Annual Report(1995/1996)		
ITEMS TO BE FOLLOWED	Meeting on Aug.31st(at 12:00)		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		



PLACE OF VISIT	The Arab Contractors Osman Ahmed Osman & Co.		
DATE	Aug.31.1997	TIME	12:00-13:00
GOFI MEMBERS	Mrs. Samira Ghobrial	JICA MEMBERS	Mr. Yoneyama Mr. Suenaga
ATTENDANTS	Mr. Shehab Eldin Ibrahim(G.Manager,Deputy Director) Mr. Ahmed Hemeid(Engineer)		
CONTENTS	An information and data requested by the questionnaire are provided and discussed. (Refer to the paper)		
RECEIVED DOCUMENTS	The paper of unit cost estimation "THE FEASIBILITY STUDY FOR THE PROJECT OF STEEL SHEETS with THE COORERATION OF JICA"		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	Misr Raymond Foundations		
DATE	Aug.28,1997	TIME	AM 10:00-11:30
GOFI MEMBERS	Mrs Samira Ghobrial	JICA MEMBERS	Suenaga
ATTENDANTS	Mr. Adel Gamal Soliman(Technical Office Manager, Civil) Mr. Magdy M Ghourab(Civil Engineer)		
CONTENTS	<p>1.Handover of questionnaire and request of the answers on "Estimates of construction unit price (work and material) for civil &amp; structural work".</p> <p>2.Clarification of the scope of supply and estimation basis</p> <p>3.The company ,belonging to Osman Gr.,is specialized for the piling work under the licensed by Raymond International, USA(since 15-16 years) and also can participate in soil investigation service in their activity.</p> <p>4.Bore hole type pile (cast in situ pile); Normal, Size:D=60-150cm,L=18-25m,Ra=100-125t Efficiency:5-6Hrs/pcs/machine (drilling/concreting)</p> <p>5.The company own a permanent fabrication shop of precast concrete pile. (standard size:450x450mm,max.L=18m,Ra=60-70t)</p> <p>6.Prestressed concrete pile: Not familiar and not common in the country.</p> <p>7.Steel pipe pile &amp; sheet pile: Material shall be imported.</p> <p>8.No rental system for sheet pile material is available in Egypt.</p>		
RECEIVED DOCUMENTS	1.Unit price list(Items related to piling work only) 2.Company's prequalification data		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	El Nasr Building & Construction Co.(EGYCO)		
DATE	Aug.30,1997	TIME	12:00-13:00
GOFI MEMBERS	Mrs. Samira Ghobrial	JICA MEMBERS	Mr. Yoneyama Mr. Suenaga
ATTENDANTS	Mr. Yehya Shoukry (Technical & Executive Managig Director) Mr. Samir Ikladious		
CONTENTS	1.Handover of questionnaire and request of the answers on "Estimates of construction unit price (work and material) for civil & structural work" 2.After understanding the situation and condition of the study, the questionnaire was not satisfactorily answered.		
RECEIVED DOCUMENTS	Company's brochure & prequalification data		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	A.O.I. (Arab Organization for Industrialization) Aircraft Factory		
DATE	27 AUG. 1997	TIME	AM 10:00-13:00
GOFI MEMBERS	ENG. YOUSSEF YOUSSEF (Engineering Dep.)	JICA MEMBERS	Mr. H.KANEMOTO, Mr. Y. ISE, Mr. M.YAMAMURA, Mr. T.INOUE, Mr. K.INOUE
ATTENDANTS	Eng. HASSAN ELSHAHE : Project Manager Eng. MOHMED ABU BAKR : Marketing Research		
CONTENTS	<p>1.A.O.I. consists of the following nine factories</p> <p>1)AIRCRAFT, 2)Engine Factory, 3)SARK Factory (Rocket), 4)Electronic Factory, 5)ARAB AMERICAN VEHICLE (AAV),6)ARAB BRITISH DYNAMIC (ABD : small rockets),7)ARAB BRITISH ENGINE COMPANY (Helicopter engine),8)KADR FACTORY (Military tank),9)HELWAN FOR DEVELOPMENT INDUSTRY (Plastics)</p> <p>2.Factory</p> <p>1)employee : approx. 4,000 persons</p> <p>2)Established about 40 years ago</p> <p>3)One of the main factory of A.O.I</p> <p>4)Principal activity</p> <p>Production of aircraft, Manufacturing trailers for general users, Production of sheet metal and mechanical parts ,All types of work such as</p> <p>equipping of cars and manufacturing components of:</p> <p>Sewage treatment plant, Water treatment unit, Trailer, Silos, Annual drier, Parabolic dish antenna, Single W.C, Accommodation caravan, Sea water purification plants, Galvanizing units,</p> <p>3.Factory tour</p> <p>1)Machining center : Lathe, Slotting, Milling, Grinding, Honing, Thread cutting, Drilling, etc.</p> <p>2)CNC tube bending machine</p> <p>3)Welding, 4)Surface treatment &amp; painting</p> <p>4.Number of designers</p> <p>30 persons</p> <p>5.Delivery</p> <p>6-9 months after contract</p> <p>6.Capability of equipment manufacturing</p> <p>Small equipment can be manufactured by this factory.</p>		
RECEIVED DOCUMENTS	1)Aircraft factory technological capabilities 2)Catalog of products		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	ALEXANDRIA SHIPYARD Gat No.36, Kabbary, Alexandria 21553, Egypt		
DATE	August 28, 1997	TIME	11:00am - 1:30pm
GOFI MEMBERS	Mr. Nabil El Saggeir	JICA MEMBERS	Mr. N. Otani Mr. H. Kanemoto Mr. I. Kawakami Mr. Y. Ise Me. K. Okamoto
ATTENDANTS	Eng. Sousry M. Hashem, Marketing director		
CONTENTS	<p>1. The following equipment and work items can be supplied for the Flat Steel Plant:</p> <p>(1) Carbon steel works</p> <p>(2) Mechanical parts</p> <p>(3) Piping</p> <p>(4) Painting and insulation</p> <p>(5) Factory maintenance</p> <p>2. Information of the steel and casting works</p> <p>(1) Indicative price of steel works: EL4,000/ton</p> <p>(2) Production capability</p> <p>- Steel : 1,500tons/month</p> <p>- Casting : 45tons/day</p> <p>(3) Maximum casting capacity : 1ton/peace</p> <p>3. General information</p> <p>(1) Total employee : 5,200 persons</p> <p>(2) Engineers &amp; workers : 4,000 persons</p> <p>(3) Having maintenance contract with ANSDK</p>		
RECEIVED DOCUMENTS	Company brochure		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	FERROMETALCO(FMC)		
DATE	Aug.30,1997	TIME	AM 10:20-12:30
GOFI MEMBERS	Eng.Youssef youssef Morsy	JICA MEMBERS	Mr.Otani, Mr.Ise, Mr.Okamoto, Mr.Kawakami, Mr.Kanemoto
ATTENDANTS	Hesham W. Galal(Project Engineer) Rainer Kersting(Production Manager)		
CONTENTS	<p>1. Objectives</p> <p>1) Investigation on supply equipment</p> <p>2) Cost investigation on equipment and installation</p> <p>2. Outline of the company</p> <p>1)Foundation year: 1979, 2) Employees: 1,054</p> <p>3) Parent: FERROSTAAL AG(Germany),100 % share holder</p> <p>4) Cap.: 1,400 tons/M(structural steel &amp; pipe works)</p> <p>3. Products and Business</p> <p>Vessels to international standards, Tanks, Building structures, Silos, Ducts, Bins, Heat exchangers, Boiler parts and Erection work.</p> <p>4. Representative Facilities</p> <p>NC Sawing/drilling machine(1,000D x 400H x 25,000L)</p> <p>Horizontal boring mill(230Dia x 7,500L x 3,900H x 2,000D &amp; 200Dia x 6,500L x 2,100H x 1,450D etc.)</p> <p>Vertical lathe(8,000Dia x 3,945H x Weight 150t)</p> <p>Center lathe(2,000/4,500Dia x 10,000L etc.)</p> <p style="text-align: right;">continued/</p>		

CONTENTS	<p>5. Reference price</p> <p>1) Fabrication---LE4,900/t(Steel structure), LE9,000/t(Furnace shell), LE15,000/t(Piping), LE11,000/t(Scrap bucket), LE8,000/t(Dedusting system)</p> <p>2) Installation---LE600/t(Steel structure), LE1,500/t(Furnace shell), LE2,800/t(Piping works)</p> <p>6. Delivery period</p> <p>2-4 months(in case of 500 tons of structures) Special materials take 10-12 weeks to deliver.</p> <p>7. Capability to produce equipment for new flat steel mill</p> <p>FMC has a potential to manufacture many equipment for DRI, Steel making equipment. But for hot rolling mill and cold rolling mill, their scope of supply may be limited because it is not good at handling small machined equipment.</p> <p>In addition, since it has very limited design engineers, it's necessary to handover all drawings prior to fabrication.</p>
RECEIVED DOCUMENTS	Brochure on the company(including supply list, facility list and quality assurance program)
ITEMS TO BE FOLLOWED	None
ITEMS TO BE DISCUSSED WITH MEMBERS	None

PLACE OF VISIT	The Egyptian Co. for Refractories - Head Office and Helwan Factory -		
DATE	Aug. 31, 1997	TIME	11:00-14:30
GOFI MEMBERS	Yousef El Hassan Ahmed	JICA MEMBERS	Mr. I. Kawakami Mr. M. Yamamura
ATTENDANTS	At Head Office: Mohamed Eid (Chairman), Ali El Binnawy (G.M. of Marketing) At Factory: Ali Lofti (Director of Plant Sector), Mageli Gomma (G. M. of Basic Plant), Ali El Binnawy (G.M. Of Marketing)		
CONTENTS	<p>1. At head office, with Mohamed Eid (Chairman)</p> <p>1) Answer to the questionnaire will be received by GOFI on 1st of September.</p> <p>2) User: 70 % for iron and steel industry including export for Libya, Syria, Saudi Arabia, etc. 15 % for cement industry. 15 % for others.</p> <p>3) Main user in steel industry in Egypt: EISCO, 25,000 t/y for all kinds. ANSDK, 6-7,000 t/y last year (3-4,000 t/y this year for un-shaped refractory, because ANSDK converted high alumina brick for ladle to Mg-C brick. Mg-C is not produced in the Company).</p> <p>4) Special refractories like sub-merged nozzle is not available.</p> <p>2. At Helwan plant with Mageli Gomma (G. M. of Plant)</p> <p>1) Products: Basic refractories (shaped and un-shaped) and alumina silicate brick</p> <p>2) Production: 26,000 t/y</p> <p>3) Shaped basic refractories: Brick of magnesia, magnesia chromium, chromium magnesia</p> <p>4) Un-shaped basic refractories: Min. 12,000 t/y of fettling, ramming, gunning, filling materials and mortar.</p> <p>5) Factory observation tour</p>		
RECEIVED DOCUMENTS	1) Answers to questionnaire 2) Brochure on the company		
ITEMS TO BE FOLLOWED	To receive the company's answers for questionnaire from GOFI		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		



PLACE OF VISIT	NOPWASD(National Organization for Potable Water and Sanitary Drainage)		
DATE	Aug.30,1997	TIME	AM 11:30~13:30
GOFI MEMBERS	Mr.Galal El Ghourab GM. Construction Project	JICA MEMBERS	T.INOUE / K.INOUE
ATTENDANTS	Eng. Abdul Hamid El Shayeb Mgr. Chemical Research		
CONTENTS	<p>1. Activated sludge system and Oxidation ditch system are same principle.</p> <p>2. Activated sludge system is the most suitable for Flat steel project.</p> <p>3. Sewage treatment system shall be supplied from local market and 3 major constructors exist in Egypt.</p> <p>4. Construction price of 500m<sup>3</sup> per day of activated sludge system is 0.9 million EL in Egypt Including : 1) Equipment and materials for mechanical, electrical and civil work 2) Civil work and installation work and Commissioning.</p> <p>5. Installation area of above system is required about 20mx20m and 10m x 10m.</p>		
RECEIVED DOCUMENTS	None		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	General Authority for Investment and Free Zones (GAFI)		
DATE	Aug. 27 & 31	TIME	9:30AM
GOFI MEMBERS	Mr. Hussein Osman	JICA MEMBERS	Mr. Hosokawa Mr. Fujinaga
ATTENDANTS	GAFI: Mr.Ali Tahaa,Under secretary JICA member: Mr.Shunji HOSOKAWA MR.Yasuo FUJINAGA		
CONTENTS	<p>The Study Team discussed with Mr. Ali Tahaa regarding the following items for the project.</p> <p>1.taxes and duties In addition to taxes and duties systems Mr.Ali Tahaa advised of the disbursement of sales tax of the imports for the plant.</p> <p>2.Labor cost The Study Team are advised that we should use the data issued by Middle East Advisry Group of World Bank for the labor cost of the study.</p> <p>3.Dividend payment In accordance with Egyptian taxation dividend payments should be divided to the share holders after the corporate tax is levied on taxable income.</p>		
RECEIVED DOCUMENTS	None		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	Alexandria Governorate		
DATE	Aug28, 1997	TIME	12:00 – 13:00
GOFI MEMBERS	Mr. Abdel Aziz Abdel Zahier	JICA MEMBERS	M. Yamamura
ATTENDANTS	Dr. Fatma Abou Shouk Senior member of the environment department		
CONTENTS	<p>1. Hearing about monitoring data of COD at El Dekhiela and Alexandria area  COD = 300 mg/l at El Dekhiela port  500 mg/l at Alexandria eastern harbor</p> <p>2. Unit of monitoring data  SOx, T.S.P = micro gm/m<sup>3</sup>  Dust = ton/mile<sup>2</sup>/month</p> <p>3. Monitoring point  Wadi El Kamer: in El Dekhiela, behind Cement Co.  El Mamel : near Alex. eastern harbor  Eshaf : behind Alex. Governorate  Smoha : near Alex. air port</p> <p>4. Data of NOx and Noise will be faxed to GOFI later.</p> <p>5. Dr. Fatma stressed the necessity of project agreement and Environmental Impact Assessment before start of the project.</p>		
RECEIVED DOCUMENTS	None		
ITEMS TO BE FOLLOWED	1. COD data at El Dekhiela port and Alex. eastern harbor 2. NOx and Noise data at El Dekhiela area		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

PLACE OF VISIT	Holding Company for Metallurgical Industries		
DATE	Sept. 1, 1997	TIME	13:00-13:40
GOFI MEMBERS	Mr. Y. El Hussan Ahmed	JICA MEMBERS	Mr. Hosokawa
ATTENDANTS	Mr. Adel A. Danaf (Chairman)		
CONTENTS	<p>General information of iron &amp; steel industry in Egypt</p> <p>1) The present production of steel products is mainly that of rebars. That of flat products is 400,000 ton per year by EISCO. Many steel companies are suffering with import of cheap prices from Russia and neighboring countries such as Saudi Arabia, Libya and Qatar.</p> <p>2) Two projects of flat steel plant are planned in the future in Egypt. These are by ANSDK and EL-EZZ Steel. Both are based on DRI. In Egypt there is little generated scrap. So, the iron ore near Aswan should be developed. The BF based iron &amp; steel plant should be studied by this iron ore in the future.</p> <p>3) Such public steel companies as EISCO, Delta Steel, etc. are under reconstructing study. Now EISCO is on the second stage, will be divided at least into three companies. For the details there is EGITALIC's study report.</p>		
RECEIVED DOCUMENTS	General Information's of Metallurgical Industries Co.		
ITEMS TO BE FOLLOWED	None		
ITEMS TO BE DISCUSSED WITH MEMBERS	None		

**Appendix 3A-3 REFERENCE UNIT PRICE FOR CIVIL AND BUILDING WORKS**

### Appendix 3A-3 REFERENCE UNIT PRICE FOR CIVIL AND BUILDING WORK

The unit price level of the following major items of construction work of civil and building, and material will be referred and considered for the budgetary estimation in the feasibility study.

#### 1. Construction Work

(1) Excavation work	
1) Sandy and clayey soil	6 - 24 LE/m <sup>3</sup>
2) Rock (including slag)	50 - 70 LE/m <sup>3</sup>
(2) Filling work (with imported material)	18 - 26 LE/m <sup>3</sup>
(3) Sheet piling work (driving & extracting)	440 - 600 LE/m <sup>2</sup>
(4) Piling work	
1) Cast-in-situ pile (D=600-1000mm)	400 - 800 LE/m
2) Pre-cast pile (D=350-600mm)	600 - 650 LE/m
(5) Concrete work (Mix.210-280 kg/cm <sup>2</sup> )	220 - 370 LE/m <sup>3</sup>
(6) Form work (Plywood)	100 - 120 LE/m <sup>2</sup>
(7) Reinforcement (re-bar) work	2,200 - 2,300 LE/ton
(8) Metal work (embedded steel etc.)	5,300 - 9,000 LE/ton
(9) Structural steel work	6,000 - 9,000 LE/ton
(10) Roofing and siding work	200 - 300 LE/m <sup>2</sup>
(11) Road work (asphalt t=50mm)	30 - 60 LE/m <sup>2</sup>
(12) Drainage work (RC pipe D=700-900mm)	700 - 900 LE/m

Note: The work includes material supply, fabrication, and construction and/or installation.

#### 2. Construction material

(1) Sand	10 - 20 LE/m <sup>3</sup>
(2) Gravel and sand mix	28 - 30 LE/m <sup>3</sup>
(3) Ready mixed concrete	170 - 220 LE/m <sup>3</sup>
(4) Reinforcement steel	1,400 - 1,900 LE/ton
(5) Form (plywood)	100 - 250 LE/m <sup>2</sup>
(6) Masonry (hollow cement block)	1 - 2 LE/no
(7) Flooring (Ceramic t=8mm)	50 - 110 LE/m <sup>2</sup>
(8) Roof and side cladding material (t=0.8mm)	40 - 50 LE/m <sup>2</sup>
(9) RC pipe (D=500-900mm)	300 - 500 LE/m

## **Appendix 4A-1 Meteorological Conditions**

**4A-1-1 Meteorological conditions (Suez)**

**4A-1-2 Meteorological conditions (Alexandria)**





4A-1-1 Meteorological Conditions (Suez) -1/2-

A Location

Area		State
Name	ATAQA Industrial Estate	SUEZ
Latitude	N 29° 56'	
Longitude	E 32° 33'	

B Meteorological condition (1931-1960)

1) Temperature ( degrees centigrade )

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Mean
Mean of Day	14.5	15.5	17.9	21.2	25.4	27.8	29.4	29.5	27.2	24.8	20.6	16.2	22.5
Maximum	20.3	21.7	24.4	28.2	32.6	35.0	36.5	36.4	33.6	31.1	26.5	22.0	29.0
Minimum	8.7	9.3	11.4	14.3	18.1	20.5	22.3	22.6	20.6	18.5	14.7	10.3	16.0
Absolute Record Max.	28.0	32.9	35.6	41.5	43.8	45.6	44.4	42.9	41.8	42.6	41.1	32.2	-
Absolute Record Min.	0.0	0.9	2.5	6.9	10.7	13.9	17.8	18.8	13.9	11.4	5.4	3.2	-

2) Relative humidity (%)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Mean
Average	70	68	64	61	58	62	67	70	70	71	73	72	67

3) Rainfall (mm)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Total	2.5	4.8	2.0	0.9	1.5	-	-	0.0	0.1	2.8	4.1	4.9	23.6
Max. in one day	7.0	21.0	11.4	9.0	12.3	-	-	0.0	2.7	30.0	32.3	24.2	-

4A-1-1 Meteorological Conditions (Suez) -2/2-

4) No. of days with rain

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
≥ 0.1 mm	1.4	1.5	0.8	0.3	0.5	0.0	0.0	0.0	0.0	0.7	0.7	1.3	7.2
≥ 1.0 mm	1.0	1.0	0.5	0.2	0.4	0.0	0.0	0.0	0.0	0.5	0.6	0.9	5.1

5) Wind

Frequency of Surface Wind Blowing from the Following Direction (%)

Direction	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Mean
N	29.1	29.5	37.8	48.2	54.2	70.9	70.6	74.4	73.8	58.3	47.6	34.9	52.4
NE	7.0	6.4	6.1	6.0	4.8	5.1	7.1	7.0	5.9	6.0	7.1	7.0	6.3
E	2.3	2.6	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	1.2	2.3	1.0
SE	4.7	3.8	3.7	2.4	1.2	1.3	0.0	0.0	0.0	1.2	1.2	2.3	1.8
S	14.0	15.4	12.2	9.7	7.2	2.5	2.4	1.2	1.2	3.6	4.8	10.5	7.1
SW	4.6	6.4	3.7	2.4	1.2	0.0	0.0	0.0	0.0	1.2	2.4	3.5	2.1
W	4.6	5.1	2.4	1.2	1.2	0.0	0.0	0.0	0.0	1.2	2.4	3.5	1.8
NW	15.0	15.4	19.5	19.3	18.1	12.6	12.9	10.4	14.3	19.0	17.8	15.1	15.8
Calm	18.6	15.4	13.4	9.6	10.9	7.6	7.0	7.0	4.8	9.5	15.5	20.9	11.7
Mean scalar wind speed (knots)	3.4	4.0	4.4	4.8	4.9	5.2	5.2	5.8	5.7	5.0	3.8	3.5	4.6

6) Seismicity

According to the report "THE GEOLOGY OF EGYPT" edited by RUSHDI SAID, the site will not belong to the "Northern Red Sea-Gulf of Suez-Cairo-Alexandria Clysmic-Trend" zone.

Source:GOFI

4A-1-2 Meteorological Conditions (Alexandria) -1/2-

A Location

	Area	State
Name	EL DEKHEILA	Alexandria
Latitude	N 31° 10'	
Longitude	E 29° 51'	

B Meteorological condition(1942-1960)

1) Temperature ( degrees centigrade )

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Mean
Mean of Day	13.4	14.3	16.0	17.8	20.9	23.6	25.4	26.3	25.1	22.8	19.9	16.2	20.1
Maximum	17.8	18.2	20.7	23.0	25.0	27.0	28.7	29.5	28.6	27.0	24.2	21.1	24.2
Minimum	9.1	10.1	11.4	14.1	17.0	20.5	22.4	23.5	21.7	18.7	15.7	11.6	16.3
Absolute Record Max.	22.8	35.6	39.7	39.8	40.6	40.6	37.1	34.6	39.8	35.4	37.3	27.3	-
Absolute Record Min.	4.0	5.6	6.6	8.0	11.7	15.3	17.4	17.0	15.4	11.1	10.6	4.2	-

2) Relative humidity (%)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Mean
Average	67	66	64	65	71	73	72	72	67	67	66	66	68

3) Rainfall (mm)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Total	59.1	36.9	14.7	2.4	0.2	0.0	0.0	0.0	0.0	4.9	19.4	30.4	168.0
Max. in one day	40.2	41.4	14.7	2.5	0.5	0.0	0.0	0.0	0.0	4.2	19.0	18.3	-

4A-1-2 Meteorological Conditions (Alexandria) -2/2-

4) No. of days with rain

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
≥ 0.1 mm	11.2	6.2	5.8	1.8	0.8	0.0	0.0	0.0	0.0	2.8	5.5	4.8	38.9
≥ 1.0 mm	7.2	4.2	3.2	1.5	0.0	0.0	0.0	0.0	0.0	1.5	2.0	3.8	23.4

5) Wind

Frequency of Surface Wind blowing from the following direction (%)

Direction	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual Mean
N	5.8	14.7	13.0	15.1	22.2	33.5	28.8	32.0	38.5	21.2	12.5	9.2	20.5
NE	4.8	18.4	13.7	24.8	31.8	18.4	8.1	7.0	21.4	38.5	31.3	19.5	19.3
E	2.5	7.7	5.9	9.5	4.6	1.2	0.5	0.0	0.6	6.6	11.7	10.9	5.1
SE	9.3	11.2	15.3	15.6	8.0	2.6	0.8	0.0	2.0	11.3	8.3	13.8	8.2
S	4.6	4.2	4.7	3.2	1.6	0.7	0.1	0.0	1.9	3.0	3.8	7.2	2.9
SW	38.9	8.6	7.9	2.7	1.6	1.4	0.9	1.1	1.9	5.8	8.2	22.9	7.6
W	11.5	4.6	5.5	2.5	2.3	1.0	2.5	1.0	0.7	1.7	3.2	5.8	3.5
NW	30.6	29.0	31.5	25.2	26.1	38.9	56.8	58.6	31.4	15.8	17.7	8.7	30.8
Calm	2.0	1.7	2.5	1.4	1.8	2.2	1.5	0.3	1.6	1.1	3.3	2.7	1.9
Mean scalar wind speed (knots)	10.2	9.1	10.5	9.8	9.0	9.8	9.4	10.2	9.0	8.0	8.0	8.2	9.3

6) Seismicity

According to the report "THE GEOLOGY OF EGYPT" edited by RUSHDI SAID, the site will belong to the "Northern Red Sea-Gulf of Suez-Cairo-Alexandria Cyclic-Trend" zone.

Source:GOFI

## **Appendix 4A-2 Availability of Typical Construction Materials**

**4A-2-1 Availability of material at site**

**4A-2-2 Availability of local material within the site**

**4A-2-3 Other construction material available in Egypt**



4A-2-1 Availability of material at site

<p>1. Aggregate &amp; Gravel</p>	<p>Several sources of the material for concrete aggregate have been developed, in consideration of quality &amp; quantity. (for example)</p> <ul style="list-style-type: none"> <li>- El Kataba area, between Cairo &amp; Alexandria, Desert Road; for normal use</li> <li>- Western part of Suez prefecture (Waddi Hagal) ; for a big amount and good quality material</li> <li>- West of Alexandria (about 40-50 km from Agami)</li> <li>- Quena (about 200 km from Safaga) ; for crushed lime stone</li> <li>- Cairo-Suez Road; ; for a good quality sand</li> <li>; for crushed stone for rail way (Basalt)</li> </ul>
<p>2. Rock</p>	<p>A small quantity and not hard rock are available at any area. More than one m<sup>3</sup> size rock (Granite) shall be obtained from Aswan or Sinai area. In case of small size rock (soft lime stone), it is available in Alexandria area.</p>
<p>3. Granular soil for road construction and embankment fill</p>	<p>Since a road construction is progressing in every region in the country, it is rather easier to obtain the material at any area from a local contractor.</p>
<p>4. Ready mixed concrete</p>	<p>There is little firm specialized in a supply of a large amount of ready mixed concrete in the country.</p> <p>In Cairo &amp; Alexandria, in case a small quantity and/or a normal quality of ready mixed concrete are required, it is available to obtain from a contractor.</p> <p>In Suez and Safaga, it is not available to obtain from a contractor but necessary to establish a supply system by himself as required.</p>

Source:KAJIMA

4A-2-2 Availability of local material within the site

1.Cement	There are factories of Alexandria cement and America cement in Alexandria area, and Suez cement in Suez area. In Safaga area, all bags of cement shall be purchased and transported from those factories in Suez or Cairo.
2.Sulfate resistant cement	A production of Alexandria Cement, America Cement, Helwan Cement & Tora Cement are available.
3.Timber	100% of the timbers are imported and various sizes are available at the stock yard at designated bond area.
4.Plywood	Any thickness of normal plywood is available from the stock of import, however, in case of a large amount, or waterproofed plywood are required, it shall be imported by himself or procured through an importing agent.
5.Brick	All kinds of bricks (sand brick, cement brick, clay brick & perforated clay brick) are available and can be obtained at/from Cairo & Alexandria.
6.Concrete products	
a. Concrete hollow block	Available sizes are 10x20x40 cm, 12x20x40 cm, & 15x20x40 cm. And a main suppliers are located in the 6th October City.
b. Concrete pipe	A production of Segwa Company at Helwan is available. The sizes are 150, 250, 300, 400, 500, 600, 700, 900 and max. 1,500 mm in diameter, and 3 m each in length.
c. Curb stone	A production of Cementsa Company at 6th October City is available. The sizes are 50x30x12/15 cm, and 50x30x8 cm.
d. Interlocking paving blocks	Several kinds and sizes are available among a production of Cementsa Company.
7.Asphalt material	A bituminous asphalt paving material are available at a local contractor's plant at any place in the country.
8.Reinforcing bars	A production of ANSDK at Alexandria and El Ezz Company at Sadat City are main and an imported material are also available.
9.PC bars	P.C. bars and cables are not available in the country and shall be imported.
10.Asbestos	A flat and corrugated sheets are available.

Source:KAJIMA



4A-2-3 Other construction material available in Egypt

1. Steel material (Grade 37-2)		Width (mm)	Length (mm)
a. Plates	t=1,2,3,4,5, & 6 mm t=8,10 mm t=12,15,16,18,20, & 25 mm t=30 up to 100 mm	1,000 1,500 1,500 1,000	6,000 9,000 6,000 12,000
b. Angles	L-50x5,60x6,70x7,80x8,90x9 100x10,120x12,150x14	-	12,000
c. U-Channel	UPN-80,100,120,140,160,200,260	-	12,000
d. C-Channel	C-140x65x4,160x65x4 mm	-	6,000
e. I-Shapes	IPE-140,160,200,270,300,360,400	-	12,000
f. H-Shapes	HEA/HEB-200	-	12,000
g. Checkered plates	t=5/6,6/7	-	3,000
h. Welded pipes	D=(21.3,26.9,33.7)x 2.5 mm D=(42.4,48.3,60.3)x(3.0,2.5) mm D=88.9x(3.5,3.0),114.3x3.5 mm 139.7x3.4 mm D=168.3x(3,4,5,6) mm D=(219.1,273.0,323.9)x(4,5,6)mm	-	6,000
2. Pile			
a. Timber pile	It is not common in the country.		
b. RC pile	It is not common in the country.		
c. PC pile	It is not common in the country.		
d. Steel pipe pile	It is not common in the country.		
e. Cast-in-situ pile	Such piling work as Impact pile(Fibro), Schtraus pile(Raymond), Bored pile(Bauer) are popular in the country.		
f. Steel sheet pile	Material shall be imported and a piling work(driving & extracting) is normally done by vibro hammer.		
g. Diaphragm wall	Protection wall of this kind is rather popular in the country. (up to 1.1 m in thickness)		
3. Welding rods	Welding rods for normal steel are available, and special ones shall be imported.		
4. Bolts & Nuts	Bolts & Nuts of normal steel are available, and those of high tensile steel shall be imported.		

Source:KAJIMA

**Appendix 4A-3 MAN POWER (WAGE/SALARY OF STAFF & LABOR - EXAMPLE)**

**Appendix 4A-3 Man Power**  
( Wage/Salary of Staff & Labor -Example-)

Classification	Unit	Wage/Salary (LE)	Remarks
<b>a. Staff</b>			
Civil Engineer	Month	2,780.0	32-35 years old
Mechanical Engineer	Month	2,240.0	32-35 years old
Electrical Engineer	Month	2,240.0	32-35 years old
Administrator	Month	2,120.0	Over 30 years old
Accountant	Month	1,700.0	Over 30 years old
Secretary	Month	1,210.0	
Interpreter	Month	970.0	
Quantity Surveyor	Month	1,130.0	
<b>b. Labor</b>			
Foreman	Day	34.0	
Surveyor	Day	30.0	
Common Labor	Day	17.0	
Unskilled Worker	Day	12.0	
Welder	Day	24.0	
Mason	Day	30.0	
Carpenter	Day	27.0	
Re-bar Bender	Day	22.0	
Re-bar Cutter	Day	21.0	
Re-bar Fixer	Day	18.0	
Concrete Worker	Day	17.0	
Crane Operator	Day	31.0	
Heavy Equip. Operator	Day	29.0	
Note: exclude a fringe benefit and over time charges etc.			
<b>(Conditions)</b>			
<b>1. Labor Law &amp; Regulation</b>			
(1) Working Hours	Basic; 8 hours/day & 48 hours/week Holiday; every friday & national holiday		
(2) Over Charges	125% for over 8 hours and until 6:00 P.M. 150% for over 8 hours and after 6:00 P.M. until 6:00 A.M. of the next day 200% on friday and national holiday		
(3) Social Insurance Premium	For a contractor; a certain % of contract amount  For a company & an employee; 11-26 % of basic salary		
<b>2. Legal Control</b>			
(1) Employ for foreigner	Necessary to get work permit		
(2) Nos. of foreigners	To be less than 10 % of the total employees		

Source: KAJIMA

**Appendix 4A-4 AVAILABILITY OF TYPICAL CONSTRUCTION EQUIPMENT**

**Appendix 4A-4 Availability of Typical Construction Equipment (1/2)**  
 (Note: A price are rounded and those in Alexandria and/or Suez region, as of Jan. '97.)

No	Construction Equipment	Capacity	Unit	Referential Price (LE)		Remarks
				(Rental in local market)		
1	Concrete batching Plant	60m <sup>3</sup> /H	Day	N/A		to be constructed
2	Crawler Crane	40ton	Day		770.0	
3	Crawler Crane	100ton	Day		1760.0	
4	Truck mounted Crane	40ton	Day		550.0	
5	Diesel Pile Driver	Kobe-KSH5	Day		1500.0	
6	Diesel Pile Driver	Hitachi-KH100	Day		1500.0	
7	Vibro Hammer	40kw	Ton		440.0	
8	Vibro Hammer	60kw	Ton		660.0	
9	Agitator Truck	6m <sup>3</sup>	Day		990.0	
10	Agitator Truck	8m <sup>3</sup>	Day		1230.0	
11	Back Hoe	0.4m <sup>3</sup>	Day		440.0	
12	Back Hoe	0.6m <sup>3</sup>	Day		660.0	
13	Clamshell	0.3m <sup>3</sup>	Day		770.0	
14	Clamshell	0.6m <sup>3</sup>	Day		880.0	
15	Bulldozer	D5(11ton)	Day		720.0	
16	Bulldozer	D7(21ton)	Day		1210.0	
17	Bulldozer	D9(44ton)	Day		1430.0	
18	Dump Truck	4ton	Day		1700	

Appendix 4A-4 Availability of Typical Construction Equipment (2/2)

(Note: A price are rounded and those in Alexandria and/or Suez region, as of Jan. '97.)

No	Construction Equipment	Capacity	Unit	Referential Price (LE)	
				(Rental in local market)	Remarks
19	Dump Truck	10ton	Day	240.0	
20	Concrete Pump Car	45-50m3/H	Day	1,100.0	
21	Concrete Pump Car	55-60m3/H	Day	1,320.0	
22	Concrete Pump Car	65-85m3/H	Day	1,650.0	
23	Flat Bed Truck	5ton	Day	170.0	
24	Flat Bed Truck	10ton	Day	280.0	
25	Engine Generator	100kva	Day	220.0	
26	Engine Generator	150kva	Day	280.0	
27	Steel Road Roller	8ton	Day	660.0	
28	Tire Roller	8ton	Day	N/A	
29	Dewatering Pump	D-100mm	No	11,000.0	if,purchased new one
30	Dewatering Pump	D-150mm	No	15,000.0	if,purchased new one
31	Giant Breaker	0.7m3	Day	1,320.0	
(Remarks)					
Such marine construction equipment as dredgers, burges, pontoons and tug boats are available at and belonging to Suez Canal Authority and his subsidiary companies.					

Source:KAJIMA

**Appendix 4A-5 CONTRACTORS**

## Appendix 4A-5 Contractors

(Note; Listed a representative contractor of the construction field in the country, and those figures are rounded off.)

### 1. General contractor

Name of Company	Capital (x10 <sup>3</sup> LE)	Annual B.Value (x10 <sup>6</sup> LE)	No of Employee
Arab Contractor	200,000	2,620	14,000
Nasr General Contractor	30,000	498	3,430
Egyptian Contractors Company	25,000	485	5,130
The Misr Concrete Department Company	30,000	300	7,700
Egyco	15,000	333	1,010

### 2. Special field contractor

#### a. Piling and/or deep foundation work

Name of company :Baure Egypt  
:Misr Raymond  
:El Nasser

#### b. Structural steel fabrication work

Name of Company	Capacity (ton/mon.)
Ferro Metalco	1,000
Stelco	1,000
Metalco	3,000
Arab Contractor	800
National Steel	1,000

#### c. Marine work

Suez Canal Authority and his subsidiary companies.

Source:KAJIMA



## **Appendix 4A-6 COMPARISON OF PLANT SITES**

[Suez/Adabiya I.F.Z and Alexandria/El Dekhiela]

SUMMARY

PROPOSED SITE CONDITIONS

TECHNICAL EVALUATION

ECONOMIC EVALUATION

PLANT GENERAL LAYOUT



## 1. 要 約

スエズおよびアレキサンドリア両地区についての技術的、経済的評価および社会的要素の比較検討結果の要約を以下に記す。

### 1) 技術的評価

スエズのアダビヤF.Z およびアレキサンドリアのエル・ディケーラの両地区とも技術的見地からは薄板工場の建設地として可能であり容認できる。

### 2) 経済的評価

－スエズ地区における建設資金額は、アレキサンドリア地区と比較して約2億7,000万LE(8,000万US\$)高いと算定された。

－スエズ地区における操業コストは、アレキサンドリア地区に比較して年間約3,000万LE(930万US\$)高いと算定された。

### 3) 立地条件

#### (a) スエズ

スエズ地区には現時点では判断することのできない下記の条件が存在している。

- －港湾施設の将来計画
- －フリーゾーンの土地取得問題
- －工業用水の給水設備と価格

#### (b) アレキサンドリア

工場建設予定地はANSDK、アレキサンドリア県庁および国防省が所有している。したがって、これら関係者のすべてが土地をプロジェクトに売却する了解を得ることが前提である。

### 4) 工場建設地の推薦

アレキサンドリア地区(エル・ディケーラ)が薄板工場建設地として適しており、コンサルト調査団はエル・ディケーラを対象として薄板工場建設計画に係わるファイビリティ・スタディを実施した。

Table 4A-6-1 Proposed Site Conditions

Item	Requirement	Suez F.Z.	Alexandria/El-Dekhiela
1. Land			
1) Location	In an industrial area, convenient for transportation of raw materials and final products	In the Adabiya Industrial Free Zone, 20km east of Suez City, facing Suez Bay. About 4 km from the raw material unloading port.	Adjacent to El-Dekhiela port and close to ANSDK. About 2.4 km to the mineral jetty in the El-Dekhiela port. Reclaimed land of Lake Maryut
2) Area and shape	Ideally 1.0 to 1.5million m <sup>2</sup> and Rectangular.	Available, approx 660,000m <sup>2</sup>	Available, approx. 600,000m <sup>2</sup>
3) Geographic and soil conditions	Flat, level and even. Solid, stiff soil. Shallow bearing stratum for foundation	Extremely steep, 30 m elevation differences. Large scale earth works required. Stiff soil.	Flat and even but low ground level. Filling and banking is required to raise 4 to 5m. Upper layer of stratum is soft clay. Piled foundation is required. (10-15 m)
4) Acquisition of land	No obstacles to be removed	Land is divided into 8 blocks surrounded by paved roads. Drainage pipe and cables are installed under the road. 30 LE/m <sup>2</sup>	Existing building and brick fence 150 LE/m <sup>2</sup>

Item	Requirement	Suez F.Z.	Alexandria/El-Dekhiela
2. Transportation facilities			
1) Roads	Paved roads , convenient for transportation between factory and market	145 km to Cairo, via 2 lanes of paved road.	210 km to Cairo, via 2 lanes of paved or agricultural roads.
2) Port and berth	Water depth ; 15-20m Length ; 300-350m	No existing port. Construction of new port facility is under consideration.	Existing port facilities at Dekhiela port are available. 20m of water depth can accommodate 125,000 DWT vessel.
b. Scrap unloading and product shipping market berth	Water depth ; 7.5-10m Length ; 150-200m	Existing port facilities at Suez or Adabiya are available.	Existing port facilities at Alexandria or Dekhiela are available
3. Energy and utilities			
1) Electric power	200MW	Available	Available
2) Natural gas	55,000Nm <sup>3</sup>	Not currently, available in future	Available
3) Industrial water	36,000 ton/day	Not currently, available in future. Desalination plant for raw water is required	Available Water softener is required.
4) Waste water sewer	24,000 ton/day	Available	Available

Item	Requirement	Suez F.Z.	Alexandria/El-Dekhiela
4. Regional conditions 1) Regional development plan  2) Supporting industries  3) Environmental restrictions	Industrial area	A part of the third year development plan  Expected  Law No.4/1994 Compliance	Within an industrial area  Available  Law No.4/1994 Compliance

Table 4A-6-2 Technical Evaluation

Item	Importance	Suez		Alexandria	
		Comment	Rating & score	Comment	Rating & score
1. Land 1) Dimension & area of the site	A	Rather small and not satisfactory, but general layout could be adjusted to accommodate the area accordingly.	I-6	Rather small and not satisfactory, but general layout could be adjusted to accommodate the area accordingly.	I-6
2) Geographical conditions	A	Extremely steep, 30m elevation differences. Large scale earth works required including excavation, filling and compacting.	I-6	Flat and rectangular, but ground level is low. Earth works for raising ground level is required.	I-7
3) Soil conditions	B	Good	A-9	Upper layer of soil is silty clay. Foundation pilling is necessary	I-6
4) Other conditions	C	Existing buried items for public use such as drainage pipe, power and telephone cable shall be replaced.	I-6	Demolition work for the existing building is necessary	I-7

Item	Importance	Suez		Alexandria	
		Comment	Rating & score	Comment	Rating & score
2. Transportation 1) Road net work 2) Railway 3) Port facilities a. Iron ore unloading berth b. Scrap & products berth	A	Available	A-10	Available	A-10
	C	Available between Cairo & Suez	I-7	Available between Cairo & Alex.	I-7
	A	Not currently. Construction plan for a new mineral jetty is under consideration.	I-5	Existing facilities are available.	A-10
	A	Available	A-9	Available	A-9
3. Utilities 1) Electric power 2) Natural gas 3) Industrial water 4) Waste water sewer	A	Available	A-10	Available	A-10
	A	Not currently. Gas piping will be installed upon request of users.	I-7	Available	A-10
	A	Not currently. Installation of water piping is under consideration.	I-5	Available. Water softener is necessary.	A-8
	A	Available	A-10	Available	A-10



Item	Importance	Suez		Alexandria	
		Comment	Rating & score	Comment	Rating & score
4. Regional conditions					
1) Meteorological conditions	C	Acceptable	N.A.	Acceptable	N.A
2) Environment & pollution control	A	Law NO.4/1994 Compliance. Acceptable	N.A	Law NO.4/1994 Compliance. Acceptable	N.A
Total evaluation		288/350 = 65		267/350 = 76	

Note : Weight of importance A =3, B =2, C =1

4A-6-3 Economical Evaluation : Comparison of Investment

Item	Suez.					Alexandria				
	Unit price (LE/Unit)	Quantity	Unit	Cost (x 10 <sup>3</sup> LE)	Remarks	Unit price (LE/Unit)	Quantity	Unit	Cost (x 10 <sup>3</sup> LE)	Remarks
Land	30	662,000	m <sup>2</sup>	19,860		150	600,000	m <sup>2</sup>	90,000	
	40	1,650,000	m <sup>3</sup>	66,000		20	2,600,000	m <sup>3</sup>	52,000	
	380	46,000	m <sup>2</sup>	17,480		380	21,000	m <sup>2</sup>	7,980	
				103,340					149,980	
Port				60,000					0	
				107,500					0	
				167,500					0	
Facilities in plant	17,000	4,000	m	68,000	From port to site	17,000	2,400	m	40,800	
				0		2,300	15,000	Piece	34,500	
				170,000	Raw water treatment				0	
				0					14,000	Raw water treatment
				238,000					89,300	
			508,840					239,280		

Difference = 269,560x10<sup>3</sup>LE  
(US\$ 80,000,000)

Table 4A-6-4 Economical Evaluation : Comparison of Operation Cost

Item	Suez Free Zone		Dekhla		Remarks	
	Investment (x10 <sup>8</sup> LE)	Cost (LE/ton)	Investment (x10 <sup>3</sup> LE)	Cost (LE /ton)		
Land	Acquisition of land	19,860	90,000	6.8		
	Land prepalation	66,000	52,000	4.5		
Port	Slope protection	17,500	7,980			
	Quay	60,000	0			
	Port facilities	107,500	0	18.4		
	Management cost	0	0			
Facilities in plant	Iron ore conveyor	68,000	40,800	4.3	From port to plant	
	Foundation (Piling)		34,500	3.5		
	Desalination plant (RO)	170,000	0	0	Raw water treatment	
Freight for iron ore	Softener	0	14,000	1.4	Raw water treatment	
		0	0	34.8		
Total		508,860	105.2	239,280	73.7	Difference = 31.5LE/ton of products

Note : Interest = 7.5% per year

31,500,000 LE/year  
(US\$ 9,320,000/year)

Figure 4A-6-1 General Plant Layout-Suez/Adabiya  
 [Preliminary]

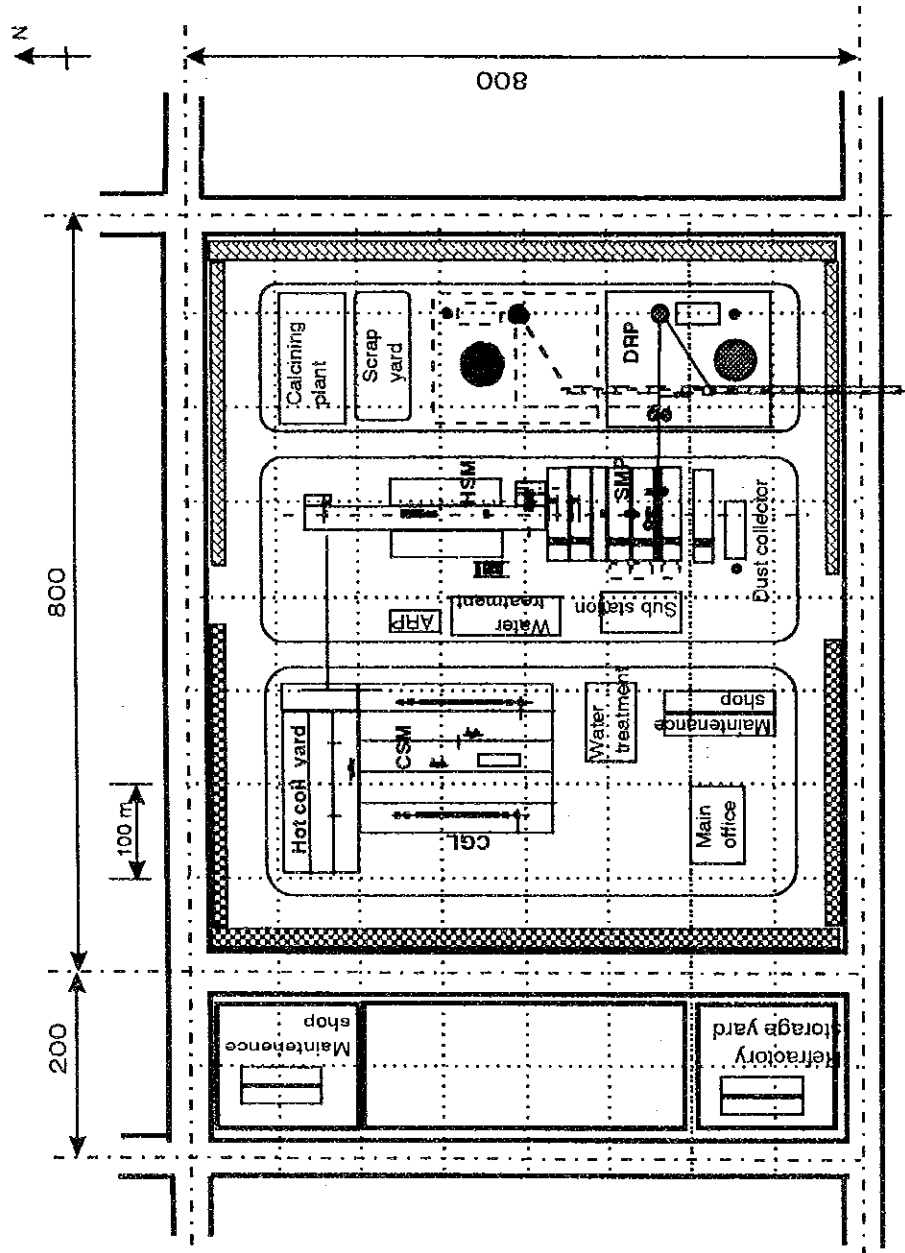


Figure 4A-6-2 Plant site Elevation-Suez/Adabiya  
 [East/West]

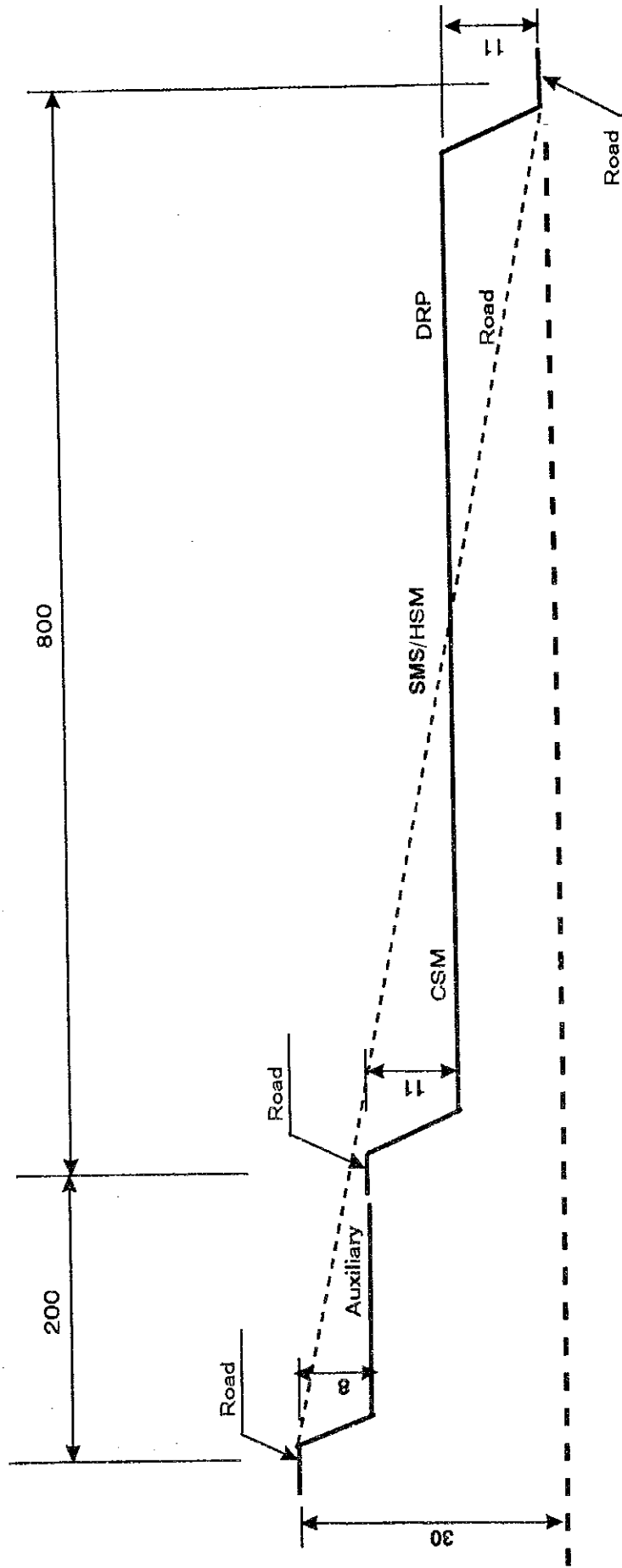
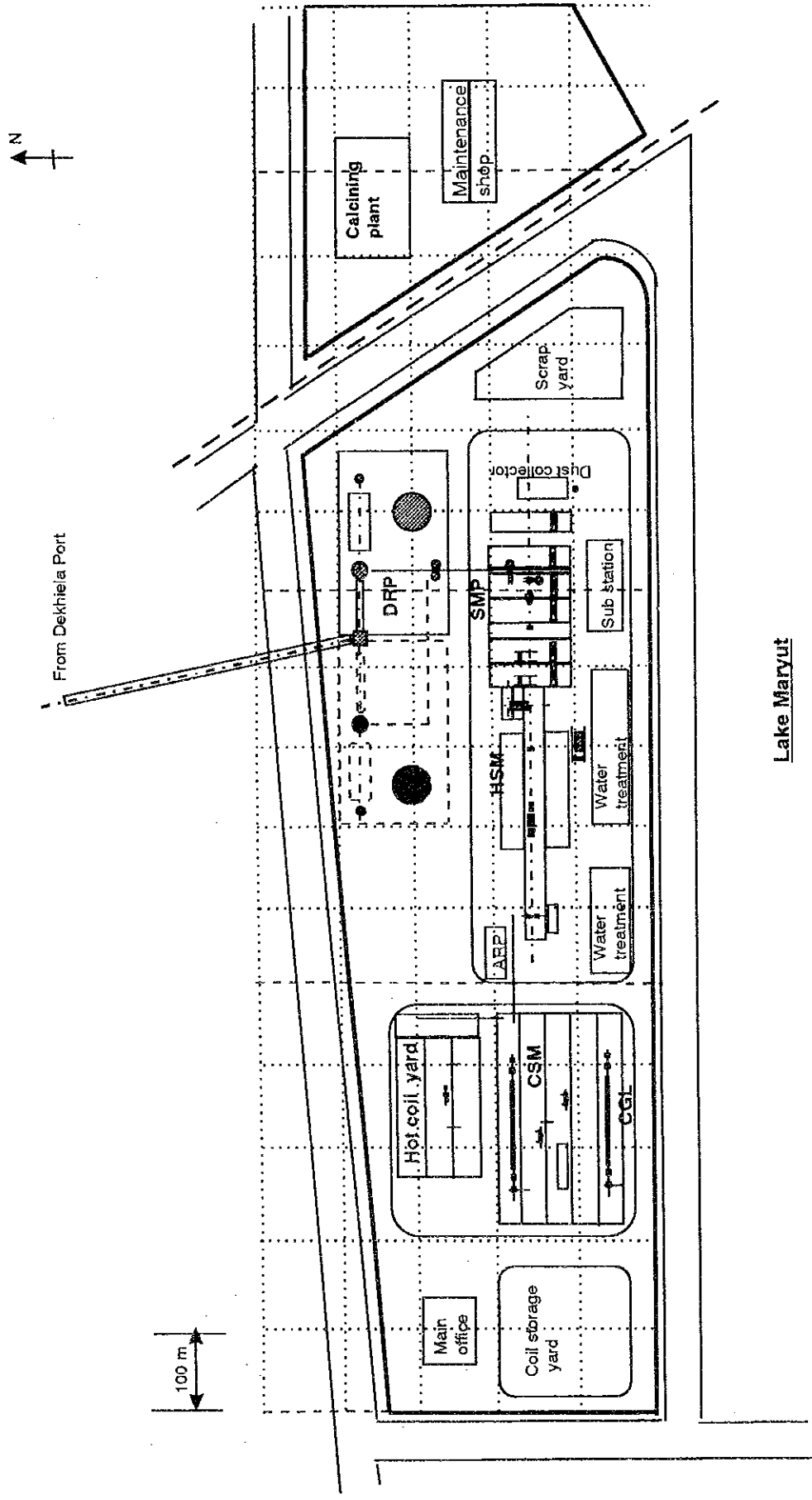


Figure 4A-6-3 General Plant layout-Alexandria/EI Dekhiela  
 [Preliminary]



Lake Maryut

**Appendix 4A-7 INFORMATION AND DATA OF SAFAGA**  
(サファガの現状)





## Appendix 4A-7 INFORMATION AND DATA OF SAFAGA

### (サファガの現状)

サファガは、第1次現地調査では、GOFIより指定された候補地の一つであったが、薄板工場建設用地として適していないため、第1次現地調査の最終時点で候補地から外された。調査中に得られたサファガに関する資料を下記に記す。

#### 1. 土地およびユーティリティの現状

##### 1-1 現地の状況（場所および面積）

サファガはカイロから南東約610 km、人口10万人で紅海沿岸最大の町のハルガダ市より南60 kmの紅海沿岸に位置する町である。市の開発計画は15年前に始められたが、現在まだ開発を進めている段階である。

図4A-3-3に示されたサファガの3つの地区（サファガI、II、III）は、紅海県より推薦されたものである。これ等の土地の正確な図面や境界線は示されなかったが、何れの土地も十分な面積が有り、地形も製鉄所建設には適しているように見えた。

サファガIIIを除いては、候補地は比較的サファガ港に近く、サファガIおよびIIはそれぞれ7 kmおよび3 kmの位置にある。土地の価格は1平方メートル当たり3~10 ELである。土地は高低差が大きく平坦ではないため土地造成が必要である。

##### 1-2 社会条件

###### 1-2-1 奨励制度および法律・規則

エジプト政府は、カイロおよびアレキサンドリアから離れた地区に12のニュー・コミュニティを建設中である。これ等の土地に投資することにより、10年間の税金の免除および安価な地価、比較的少ない市への負担等の、投資を奨励するための多くの奨励制度が適用される。自己の資金による事業規模の拡張および系列会社の設立についても、税金の免除が受けられる。

しかしながら、サファガおよびスエズは、ニュー・コミュニティには指定されていない。

ニュー・コミュニティに加え、エジプト政府は自由貿易地区を設けている。自由貿易地区への投資はニュー・コミュニティ程の優遇措置は期待できない。この制度は、1994年に製造業の能力を上げ、雇用機会を作り、輸出により外貨を稼ぐことを目的として設定された。

2つのタイプの自由貿易地区が General Authority for Investment (投資庁) により設定されている。その一つは、公営企業の大規模なプロジェクトを対象とし、他は、私企業による単一プロジェクトを対象として設定されている。本薄板工場は、公営企業用の地区に設置するのに十分な規模である。

現在5つの自由貿易地区が操業に入っており、3個所の地区が新たに指定された。さらに、2つの地区が検討されている。これ等の地区は表 4A-3-1 に示した。サファガ、スエズおよびアレキサンドリアには、それぞれ自由貿易地区が有り、優遇措置は主に商業活動に運用されている。そして、法第 159/1981 年によって決められた小規模の優遇措置も適用される。

Table 4A-7-1 Public Free Zones

Stage	Zone	Governorate
Operating	Alexandria	Alexandria
	Nasr city	Cairo
	Port Said	Port Saidd
	Suez	Suez
	Ismailia	Ismailia
Newly approved	Safaga	Red Sea
	Cairo	Cairo
	Damietta	Damietta
Newly under studying	East	Port Said
	Al Arish	North Sinai

Source: "New Communities, Aug. 1995" by American Chamber of Commerce in Egypt

#### 1-2-2 関連企業

アレキサンドリアおよびスエズの工業は発展途上にあるが、サファガでは、薄板工場が操業しても、十分な関連企業が育つまでには多くの年月が必要であると考えられる。

#### 1-3 建設工事の必要条件

製鉄所の建設には膨大な量の建設資材と多くの職種の労働者、各種の建設気化機械が必要とされ、これ等が十分な経験に基づいて管理されること、また、建設現場におい

ては、建設資材、労働者、建設機器等が十分に補給できることが重要である。工業化地区に指定された3個所の候補地を調査したが、サファガは、1997年末までに完工予定で建設中の燐鉱石積出港以外には、大規模な建設工事は行われていない。したがって、薄板工場建設工事のために必要な建設資材、労働者、建設機器等は、カイロその他の地区より調達する必要がある。

## 2. 輸送および港湾設備

### 2-1 港湾設備

サファガ港は、紅海西沿岸に位置し、エジプトの本土とサファガ島とに囲まれた天然の港であり、埠頭の建設に適しているため、港は十分な深さがある。

- 穀物、一般貨物および旅客船には、推進 14 m、長さ 290 の3つの埠頭が使用されている。
- アルミニウムおよび石炭の荷役には、水深 8~10 m、長さ 336m の2つの埠頭を使用している。
- 燐鉱石荷役の専用埠頭として、水深 15 長さ 400 m の埠頭を現在建設中である。

サファガおよびスエズ港湾局によると、上記の燐鉱石専用埠頭に隣接して新しい鉱石埠頭を建設するには、事前に関係各省の合意を必要とするが、建設は可能であろうとのことであった。ただし、建設費は薄板工場の負担になる。

### 2-2 道路および鉄道

内陸輸送は原料および製品の輸送に関して、薄板工場の操業コストに大きな影響を及ぼす。経済的なコストで原料の短期間の輸送と、製品の安全な運搬を保証する信頼性のある輸送機関が必要である。

エジプトの内陸輸送の状況を下記に述べる。

#### 2-2-1 道路輸送

エジプトには 45,000 km の道路があり、その内 17,000 km は比較的良好な都市間を結ぶ道路である。カイロとアレキサンドリア、スエズ、イスマイル、ポートサイド、と他のデルタ地区、さらに、アスワンやハイダムも道路で結ばれており、それ等の道路はの状況は良い。都市間の道路の舗装は 1981 年の 8,365 km から 1,995 年には 18,770 km に延長された。表 4A-3-2 には舗装道路の長さを示した。

Table 4A-7-2 Length of Paved Roads by Main Governorate

Unit: km

Governorate	Width of Road (m)			Total
	<7.5	7.5-12	>12 or double	
1) Cairo	-	338	233	571
2) Alexandria	97	-	132	229
3) Suez	60	309	378	747
4) Port Said	-	19	78	97
5) Red Sea	736	888	16	164
Total	6,692	9,885	2,193	18,770

Source: CAPMAS

Note: 1995

道路の状況はスエズは一般的に良好であるが、紅海沿岸の道路は良好とはいえない。新たに計画中の道路には次のようなものがある。

- アルマント (Armant) ~エル・カルガ (El Kharga)
- エワイナット・シャーク (Ewainat Shark) ~アブ・シンベル (Abu Simbel)
- アシュート (Assuit) ~ハルガダ (Hurghada)
- ダウロート (Daurout) ~エル・フラフラ (El Frafra)
- アスワン (Aswan) ~シャラティーン (Shalateen)

### 2-2-2 鉄道輸送

サファガの鉄道は単線で、西エル・カルガ (El Kharga) に通じている

## 3. 給排水および排水処理

### 3-1 給 水

#### 3-1-1 水 源

既存のクエナ(Qena)-ハルガダ (Hurghada) 間の給水配管 (径 200 mm)の給水能力は 1,250 m<sup>3</sup>/hr (30,000 m<sup>3</sup>/d)で、容量 40,000 m<sup>3</sup>の貯水槽に貯水される。

供給能力 56,000 m<sup>3</sup>/d のクライマット(Kuraimat)~ハルガダ (Hurghada) 間の給水管は現在建設中で、1997 年末に完成の予定である。しかし、この給水管はサファガを通らない。サファガとハルガダの距離は 60 km ある。

これ等の給水管は市民の飲料水用であり、薄板工場にもこの給水管にて給水される。

ただし、工業用水の給水計画は、サファガには無い。

薄板工場の建設がサファガに決まった場合には、地下水汲上げのための井戸を掘るか、或るいは、海水の淡水化設備を建設する必要がある。

サファガ、スエズおよびアレキサンドリアの飲料水と原水の供給設備の概要を表 4A-7-3、4A-7-4 以下に示す。

### 3-1-2 下水および工場排水

サファガの I, II および III の何れの候補地にも、既存の下水および工場排水処理設備は無い。

## 3-2 天然資源およびエネルギー

### 3-2-1 電 力

220kV、150 MW (75 MW 2 系列) の電力が、1997 年末に、エル・サゴレ (El Asagoreb) から供給されるようになる。しかし、この供給能力は薄板工場の操業には不十分であり、薄板工場の操業には別途供給設備の建設が必要である。

### 3-2-2 天然ガス

アレキサンドリアおよびスエズには天然ガスの供給配管はあるが、サファガには既存の配管はなく、将来の敷設計画も無い。

天然ガス供給配管は、約 150 km 遠方のラス・ガレブ(Ras Gareb)から敷設することになる。

サファガ、および、アレキサンドリア、スエズの天然ガスの供給配管の現状を表 4A-3-5 に示す。

Table 4A-7-3 Potable Water(Requirement for Flat Product Plant)

Proposed sites	Area	Pipe line (mm)	Capacity m <sup>3</sup> /d (future)	Result
Safaga	Safaga I	200	30,000	Available
	Safaga II	-		
	Safaga III	200	30,000	Available
Suez	Suez I	1,000	11,000 (30,000)	Available
	Suez II	1,000	11,000 (30,000)	Available
	Suez III	1,000	11,000 (30,000)	Available
Alexandria	Mannshia	1,000	30,000	Available
	Merghen	1,000	30,000	Available

Table 4A-7-4 Raw Water (Requirement for Flat Project)

Proposed site	Area	Pipe line	Distance from the nearest water sources
Safaga	Safaga I, II, III	Not available	None *1
Suez	Suez I, II, III	Available	1) 10-12 km from Suez Canal 2) Further study for using the treated sewage water is required.
Alexandria	Mannshia	Available	5 km from Mahmodia canal
	Merghen	Available	15 km from Nobarria canal

\*1: The development of under ground water for drilling well or installation of desalination plant are required.

Table 4A-7-5 Natural Gas Supply Pipe Line to Sites

Proposed sites	Pipe line	Future plan	Distance from nearest line
Safaga	Not exist	Not exist	150 km (Ras Gareb)
Suez	Exist	?	
Alexandria	Exist	Exist	

#### 4. 自然環境

##### 4-1 サファガの気象 (1943-1960)

- 気 温(°C)
  - 年間平均 : 最高 27.0, 最低 17.7
  - 既往値 : 最高 43.0, 最低 3.4
- 降雨量(mm)
  - 年間平均 : N/A (年間全降雨量 4mm)
- 相対湿度(%)
  - 年間平均 : 52
- 風 向 : 卓越風 ; 北北西, 西北西
- 地 震 : 第1地震帯 "紅海/デルタ/地中海" および  
第3地震帯 "アカバ湾/死海"に属す。

##### 4-2 地 形

指定された3個所の候補地は、何れも海岸に面しており、自然の荒地で、海面からの高さは十分高い。土地は傾斜がある上、高低差が大きく、整地を必要とする。また、地形図によると、候補地IIおよびIIIには、水無谷 (waddy) が横切っている。

##### 4-3 地 質

土地は荒地で、風化し侵食されており、地表は砕かれた岩石、荒い砂および砂利である。

表層の地層および支持層等についての資料は入手できなかったもので、不明である。また、地下水は無いようであり、表層の地耐力は1 kg/cm<sup>2</sup>程度と推定される。

#### 4-4 海 象

薄板工場の港湾建設の場所は、サファガ島の南側で、島に囲まれたサファガ湾の南になると考えられる。海図によると、既存の石油埠頭近辺が適しているが、正確な地図や海象の資料は得られなかったため、詳細は不明である。

#### 5. 環 境

現在、サファガでは、大規模の工業はなく、地形的にも良好で環境汚染の問題はない。したがって、薄板工場が公害防止設備を設置すれば、操業開始後も環境問題は起こらないと考えられる。



**Appendix 6A-1 DIRECT REDUCTION PLANT**

**Appendix 6A-1-1 DIRECT REDUCTION PLANT EQUIPMENT LIST**

**Appendix 6A-1-2 DIRECT REDUCTION PLANT DRAWINGS**

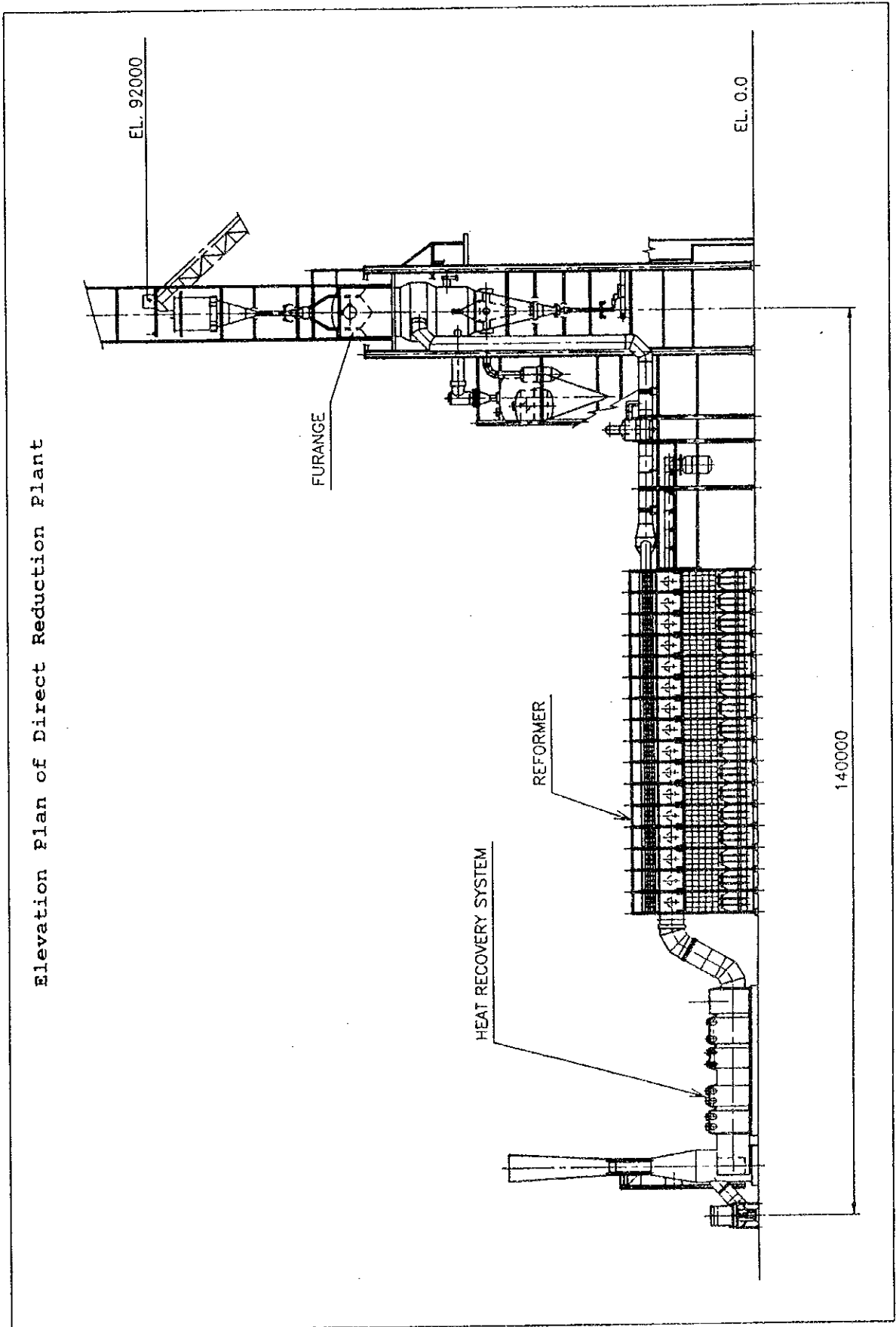


Appendix 6A-1-1 Direct Reduction Plant Equipment List

No.	Equipment	Q'ty	Specification
DR01	Process Gas System		
0101	Reduction furnace	1	134 t/h, 6.5 mID
0102	Furnace feed leg	1	
0103	Cooling gas distributor	1	
0104	Cooling gas off-take	1	
0105	Burden feeder water tank	1	
0106	Reformer tube	450	250 mmID
0107	Reformer	1	15 bay, 6 rows
0108	Catalyst	1 lot	
0109	Reformed gas cooler	1	
0110	Top gas scrubber	1	
0111	1st stage process gas compressor	2	Rotary lobe type
0112	Pulsation dumper for 1st process gas compressor	2	
0113	2nd stage process gas compressor	2	Rotary lobe type
0114	Pulsation dumper for 2nd process gas compressor	2	
0115	Process gas mixer	1	
0116	Process gas mist eliminator	1	
0117	Process gas aftercooler	1	
0118	Cooling gas scrubber	1	
0119	Cooling gas compressor	2	Rotary lobe type
0120	Pulsation dumper for cooling gas compressor	2	
0121	Cooling gas mist eliminator	1	
DR02	Combustion System		
0201	Main air blower	1	Centrifugal type
0202	Recuperator	2	
0203	Fuel gas mixer	1	
0204	Main burner (A)	150	Diffusion type
0205	Main burner (B)	60	Diffusion type
0206	Auxiliary air blower	1	Centrifugal type
0207	Auxiliary burner	60	Premix type
DR03	Flue Gas System		
0301	Dilution air blower	1	Centrifugal type
0302	Ejector stack	1	
0303	Ejector stack fan	1	Centrifugal type
DR04	Seal Gas System		
0401	Seal gas cooler	1	
0402	Seal gas compressor	1	Positive displacement type
0403	Seal gas aftercooler	1	
0404	Seal gas refrigerant dryer	1	
0405	Purge gas compressor	2	Positive displacement type
0406	Purge gas adsorption dryer	1	
0407	Purge gas tank	3	

No.	Equipment	Q'ty	Specification
0408	Inert gas generation unit	1	
0409	Upper slide gate	1	
0410	Lower slide gate	1	
DR05	Process Water System		
0501	Scrubber venturi booster pump	2	
0502	Top gas scrubber recycle pump	1	
0503	Clarifier	1	
0504	Clarifier underflow pump	2	
0505	Chemical dosing unit	1	pH control/flocculant
0506	Cold process water pump	3	
0507	Cooling tower	1	
0508	Hot process water pump	2	
DR06	Oxide Handling System		
0601	Day bin discharge feeder	3	
0602	Day bin discharge conveyer	3	
0603	Day bin transfer conveyer	1	
0604	Furnace feed conveyer	1	300 t/h, 900 mm width
0605	Oxide day bin	3	
0606	Remet feeding unit	1	
0607	Furnace charge hopper	1	
DR07	Product Handling System		
0701	Upper burden feeder	1	
0702	Middle burden feeder	1	
0703	Lower burden feeder	1	
0704	Furnace discharge feeder	1	Vibrating type
0705	Product storage bin	3	7000 ton each
0706	Grating feeder	1	
0707	Product storage bin discharge feeder	3	Vibrating type
0708	Furnace discharge conveyer	1	
0709	Product elevating conveyer	1	
0710	Product bin feed conveyer		With tripper
0710	Cold DRI briquetting unit	1	
DR08	Machinery Cooling Water System		
0801	Burden feeder cooling water pump	2	
0802	Machinery cooling water pump	2	
0803	Machinery cooling water heat exchanger	1	Plate type
DR09	Non-process Services		
0901	Instrument air unit	1	
0902	Plant air unit	1	
DR99	Spare Parts and Consumable		
9901	Spare Parts	1 set	
9902	Consumables	1 set	

Appendix 6A-1-2 Elevation Plan of Direct Reduction Plant



**Appendix 6A-2 STEELMAKING PLANT**

**Appendix 6A-2-1 STEELMAKING PLANT EQUIPMENT LIST**

**Appendix 6A-2-2 STEELMAKING PLANT DRAWINGS**

Appendix 6A-2-1 Steelmaking Plant Equipment List

No.	Equipment	Q'ty	Specification
SM01	Handling Facilities		
SM011	Scrap Handling Facilities		
01110	Scrap bucket	2 sets	1) 60 t scrap charge, clam shell type
SM012	DRI and Additives Handling Facilities		
01210	DRI/lime storage system	1 lot	1) Junction houses (J/H): 2 sets 2) DRI/lime conveyor: 250 t/hr x 2 sets 3) Tripper: 250 t/hr x 1 set for No.2 DRI/lime conveyor, 4) DRI storage hopper: 200 m <sup>3</sup> x 2 sets 5) Lime storage hopper: 200 m <sup>3</sup> x 1 set
01220	DRI/lime charging system into EAF	1 lot	1) DRI weighing feeder: 230 t/hr x 2 sets 2) Lime weighing feeder: 30 t/hr x 1 set 3) No.3 DRI/lime conveyor: 260 t/hr x 1 set 4) Charge hopper: 1 set 5) Swing chute: 1 set
01230	Additives storage system	1 lot	1) Dumping hopper: 1 set 2) No.1 additive conveyor: 1 set 3) No.2 additive conveyor: 1 set 4) Tripper for No.2 additive conveyor: 1 set 5) Storage hopper: 10 sets, with feeder
01240	Additives charging system into EAF	1 lot	1) Lorry car: 1 set, with weigher 2) EAF charge hopper: 1 set

No.	Equipment	Q'ty	Specification
01250	Additives charging system into ladle	1 lot	1) Chute to ladle charge hopper : 1 set 2) Ladle charge hopper: 1 set 3) Chute to ladle: 1 set
01260	Additives charging system into LF	1 lot	1) Chute to LF charge hopper: 1 set 2) LF charge hopper: 1 set 3) Chute to LF: 1 set
01280	Dedusting equipment for DRI and additives handling facilities	1 lot	1) Dedusting equipment for J/H: 2 sets 2) Dedusting equipment for tripper: 1 set 3) Dedusting equipment for CDRI/lime weighing feeder: 1 set
SM013	Ladle handling facilities		
01310	Ladle	7 sets	1) For 160 t molten steel with ladle valve and bubbling plug fixtures
01320	Ladle transfer car for EAF	1 set	1) With weigher
01330	Ladle transfer car for LF	2 sets	
01340	Ladle dryer	2 sets	1) Natural gas combustion type
01350	Ladle preheater	1 set	1) Natural gas combustion type
01360	Ladle valve maintenance station	1 lot	1) Deck:2 sets 2) Ladle stand: 2 sets 3) Hydraulic unit: 2 sets for station and CCM casting floor
01370	Ladle relining station	1 lot	1) Deck for 2 ladles: 1 set 2) Moval deck and ladder: 2 sets
01380	Ladle dismantling station	1 set	1) Ladle stand
SM014	Slag handling facilities		
01410	Slag pot	6 sets	
SM02	Electric arc furnace facilities		



No.	Equipment	Q'ty	Specification
SM021	Electric arc furnace	1 set.	1) DC furnace with EBT system, water cooled shell and roof 2) Heat capacity: 160 t excluding 20 t hot heel 3) Transformer capacity: 133 MVA 4) Electrode: 30 inches dia. 5) Furnace tilting, roof swing, electrode hoisting, slag door hoisting: By hydraulic cylinder
SM022	Utility system and piping	1 lot	1) Cooling water piping 2) Pneumatic piping 3) Hydraulic system 4) Furnace bottom cooling air piping 5) Lubrication system
SM023	Auxiliary equipment		
02310	Tapping hole maintenance Deck	1 set	
02320	Bottom electrode push up Device	1 set	
02330	Oxygen and carbon injection manipulator	1 set	
02340	Carbon injection system	1 set	
02350	Gunning system	1 set	
02360	Electrode nipling device for EAF	1 set	
02370	Electrode stand for EAF	1 set	
SM03	Fume extraction system		1) Bag filter type combined of EAF direct suction, LF direct suction and building suction 2) Total gas volume will be controlled by varying fan revolution with torque converters. Gas volume of each suction will be controlled by dampers
SM031	EAF direct suction system	1 lot	
SM032	EAF tapping side local suction System	1 lot	
SM033	LF Direct suction system	1 lot	
SM034	Building suction system	1 lot	

No.	Equipment	Q'ty	Specification
SM035	Bag house and dust handling Facilities	1 lot	
SM04	Ladle furnace facilities		
SM041	Furnace	1 set	1) Ladle capacity: 160 t 2) Transformer capacity: 23 MVA 3) Electrode: 16 inches dia. 4) Electrode hoisting, electrode clamping, roof lifting: By hydraulic cylinder
SM042	Ladle stirring equipment	1 lot	
04210	Ladle bottom stirring device	2 sets	
04220	Emergency stirring lance	1 set	
SM043	Auxiliary Equipment		
04310	Temperature, oxygen content and sampling device	1 set	
04320	Electrode stand for LF	1 set	
SM05	Cranes and jib cranes facilities		
SM051	Cranes		
05110	110/30 t scrap charging crane	1 set	1) At EAF aisle
05120	280/70 t ladle crane	1 set	1) At ladle aisle
SM052	Jib cranes and hoist	1 lot	
SM053	Hoists	1 lot	
SM06	Electrical equipment, instrumentation and computer system		
SM061	Electric power supply and distribution		
06110	Flicker compensation equipment And higher harmonics filter	1 lot	1) Thyristor controller reactor: 1 set 2) Thyristor power controller: 1 set 3) Higher harmonics filter: 1 set

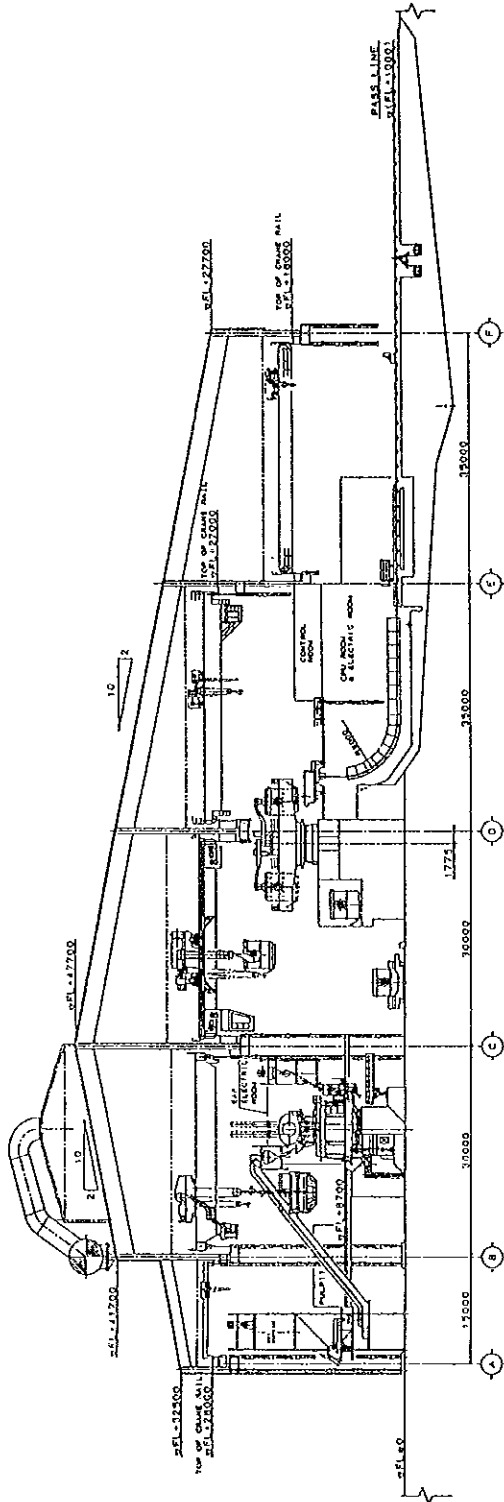
No.	Equipment	Q'ty	Specification
06120	33/6.6 kV local substation	1 lot	1) 33 kV switchgear: 1 set 2) 33/6.6 kV step down transformer: 1 set 3) 6.6 kV switchgear: 1 set 4) 6.6 kV static capacitor: 1 set 5) 6.6 kV/400 V step down transformer: 3 sets 6) 6.6 kV/3.3 kV step down transformer for HV crane power source: 1 set
SM062	DRI and additive handling system	1 lot	
SM063	Melt Shop		
06310	DC electric arc furnace	1 lot	1) 33 kV switch gear: 2 sets 2) Transformer-rectifier assembly: 2sets x 66.5 MVA 3) DC reactor: 2 sets
06320	EAF auxiliary equipment	1 lot	
SM064	Dedusting system	1 lot	1) 6.6 kV switchgear: 1 set 2) 6.6 kV/400 V step down transformer: 1 set
SM065	Ladle furnace		
06510	Ladle furnace	1 lot	1) 33 kV switchgear: 1 set 2) Ladle furnace transformer: 23 MVA x 1 set
06520	LF auxiliary equipment	1 lot	
SM066	Information system		
06610	Automatic control system	1 lot	1) Computer control system: 1 set for EAF and LF
06620	Intercommunication system	1 lot	
06630	Television system	1 lot	
SM067	Common electrical		
06710	Cranes and jib crane	1 lot	
06720	Lighting	1 lot	
06730	Outlet for small power	1 lot	
06740	Power supply to EOT cranes	1 lot	
06750	Fire protection system	1 lot	

No.	Equipment	Q'ty	Specification
06760	Ventilation and air conditioning system	1 lot	
SM07	Continuous casting machine facilities		
SM071	Slab caster	1 set	1) Type: Vertical bending type 2) Strand: 1 str. 3) Slab size: 210 mm thickness x 800 – 1,600 mm width x 5 – 10.9 m length 4) Slab weight: 28.0 t max. 5) Casting speed: 2.0 m/min. max.
7110	Ladle handling equipment	1 lot	1) Ladle turret 2) Emergency trough
07120	Tundish facilities	1 lot	1) Tundish: 2 sets, approximately 30 t capacity 2) Tundish car: 2 sets 3) Tundish preheater: 2 sets 4) Tundish nozzle preheater: 2 sets
07130	Supporting structure and cooling chamber	1 lot	1) Steel structure, cooling chamber and ladle operating deck 2) Steam exhaust equipment
07140	Mold and oscillating facilities	1 lot	1) Mold assembly 2) Mold oscillation equipment
07150	Strand guide and withdrawal unit	1 lot	1) Strand guide segments 2) Segment removal system 3) Support frame 4) Roll drive unit 5) Dummy bar head disconnecting device
07160	Dummy bar and cutting facilities	1 lot	1) Dummy bar 2) Cutting equipment Torch cut-off type
07170	Discharge equipment	1 lot	1) Discharge tables 2) Dummy bar storage 3) Deburring equipment 4) Marking equipment
SM072	Maintenance equipment (Mechanical equipment)		

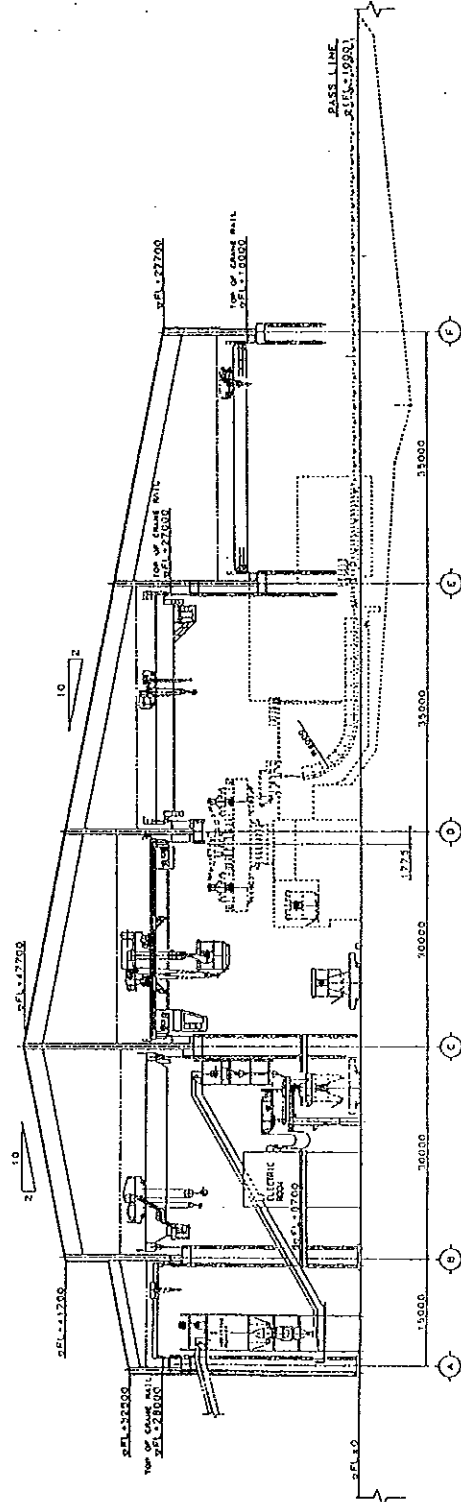
No.	Equipment	Q'ty	Specification
07210	Tundish repairing equipment	1 lot	1) Stands 2) Lifting beam
07220	Mold and segment maintenance Equipment	1 lot	1) Stands 2) Lifting beams 3) Mold and segment transfer car
SM073	Information system		
07310	Production and process control System	1 lot	
07320	General instrumentation	1 lot	1) Tundish weigher 2) Mold level control
07330	Basic automation	1 lot	1) PLC system
07340	Communication system	1 lot	
SM074	Utilities Distribution		
07410	Water circuit and cooling system	1 lot	1) Mold cooling water system 2) Secondary spray cooling water system 3) Machine cooling water system (closed circuit) 4) Machine cooling water system (open circuit)
07420	Gas and compressed air	1 lot	1) Argon gas 2) Oxygen gas 3) Compressed air
07430	Hydraulic and lubrication system	1 lot	
SM075	Electrical power supply and distribution		
07510	High voltage facilities	1 lot	1) 6.6 kV switchgear: 1 set 2) 6.6 kV/400 V step down transformer: 1 set
07520	Low voltage facilities	1 lot	
07530	Electrical equipment and motor	1 lot	
07540	Emergency power supply		
SM076	Cranes and hoists		
07610	80/20 t TD handling crane	1 set	1) Cutter yard
07620	70/10 t maintenance crane	2 set	1) Delivery yard and discharging yard
07630	3 t service crane	1 set	1) At scale pit

No.	Equipment	Q'ty	Specification
07640	Hoists and jib crane	1 lot	
SM99	Spareparts and consumables	1 lot	

Apendix 6A-2-2 Steel Making Plant Drawings



SECTION A-A



SECTION B-B