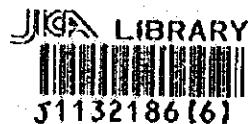


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
ARAB REPUBLIC OF EGYPT
THE GENERAL ORGANIZATION FOR INDUSTRIALIZATION

**FINAL REPORT
FOR
THE FEASIBILITY STUDY
ON
INSTALLATION OF STEEL FLAT PRODUCTS COMPLEX
IN
THE ARAB REPUBLIC OF EGYPT
(PHASE-1)
(Summary)**

November, 1996



UNICO INTERNATIONAL CORPORATION
KITAKYUSHU INTERNATIONAL TECHNO-COOPERATIVE ASSOCIATION(KITA)

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CONTENTS OF SUMMARY

| | |
|---------------------------------------------------------------------------------------|--------|
| Summary | S - 2 |
| 1. REVIEW OF THE NATIONAL ECONOMY AND INDUSTRY IN EGYPT | S - 6 |
| 1-1. Recent Economic Conditions | S - 6 |
| 1-2. Development Policy | S - 8 |
| 1-3. Industrial Structure..... | S - 10 |
| 1-4. Present Status of Steel Industry | S - 12 |
| 1-5. Regional Location of Industries..... | S - 14 |
| 1-6. Natural Resources and Energy..... | S - 16 |
| 2. MARKET ANALYSIS OF STEEL FLAT PRODUCTS | S - 18 |
| 2-1. Major Consuming Industries for Steel Flat Products..... | S - 18 |
| 2-2. Existing Production Facilities for Steel Flat Products in Egypt..... | S - 19 |
| 2-3. Production Mix and Main Specification of EISCO | S - 22 |
| 2-4. Past Production Trends..... | S - 23 |
| 2-5. Import and Export..... | S - 24 |
| 2-6. Tendency Sales Price of Steel Flat Products..... | S - 25 |
| 3. STUDY ON THE CONDITIONS OF NEIGHBORING COUNTRIES AND PROJECTION OF EXPORT | S - 26 |
| 4. DEMAND SURVEY OF STEEL FLAT PRODUCTS | S - 28 |
| 4-1. Direct and Indirect Steel Flat Products Consumption..... | S - 28 |
| 4-2. Domestic Demand Projection..... | S - 32 |
| 4-3. Future Projection of Production (Volume, Product Mix)..... | S - 39 |
| 4-3-1. Conclusion | S - 39 |
| 4-3-2. Conditions for Future Projection of Production of the New Plant | S - 40 |
| 4-3-3. Domestic Demand Excluding Flat Steel of Over Size | S - 40 |
| 4-3-4. Production Amount in Term of Slab..... | S - 41 |
| 4-3-5. Production Mix of the New Plant | S - 41 |
| 5. EVALUATION OF NEED FOR A NEW FLAT PRODUCT PLANT CONSTRUCTION | S - 42 |



SUMMARY

The Feasibility Study on Installation of Steel Flat Products Complex In The Arab Republic of Egypt (Phase-1)

Summary

This report provides the results of Phase-1 of The Feasibility Study on Installation of Steel Flat Products Complex in The Arab Republic of Egypt, principally comprising the estimation of future Egyptian demand for steel flat products, on the basis of which the decision on whether to proceed to Phase 2, a study on construction of a steel flat product mill, is to be made.

In order to forecast the future demand, a study was made of Egypt's gross domestic product and current conditions relating to consumption of steel flat products in the country. Study was also made of the future growth of the gross domestic product.

Present demand for product was calculated in terms of apparent consumption i.e., subtracting exports from the sum of domestic production and imports.

Field studies were made of the principal industries and companies that are users of steel flat products, as of 1995. They include construction, shipbuilding, welded pipes, gas cylinders, metal containers, railway vehicles and boilers (these being the users of plate and hot rolled sheet mainly), home electric appliance, automobile, food can, and metal furniture industries (the latter group being the users of cold rolled sheet mainly).

On the basis of the apparent consumption in 1995, and the use of steel flat products in these industries, the pattern of demand by industry and by dimensions (width and thickness) was derived.

Several methods were used to project future demand using the foregoing analyses of present consumption. In the absence of a reliable economic growth forecast from the government or international agencies, the Study Team, under the consent of GOFI, formulated three cases, high, medium, and low growth of GDP.

Demand in 2005 was forecast on the assumption that the proposed mill would be in full operation (using 100% of capacity), the using a build-up approach of accumulating future demand by thickness in each of the major consuming industries.

It was judged that the use of steel in Egypt had fluctuated so wide in the past that they would not be suitable for forecasting demand after 2005. The demand forecasts were based on the relationship between per capita GDP and steel consumption in a large number of countries.

From these forecasts, products thought to be unsuitable for the proposed mill, namely steel over 1,500mm in width and over 24mm in thickness, were subtracted; production by EISCO was also subtracted in order to derive the quantity of steel of certain width and thickness that would be made by the proposed mill.

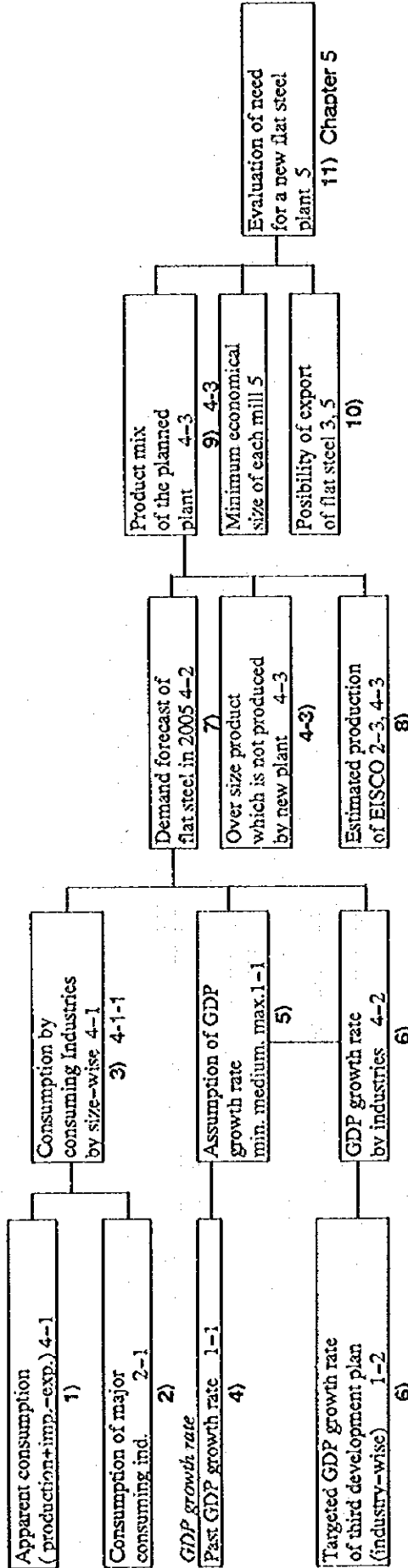
Evaluation

Product mix of the Planned plant

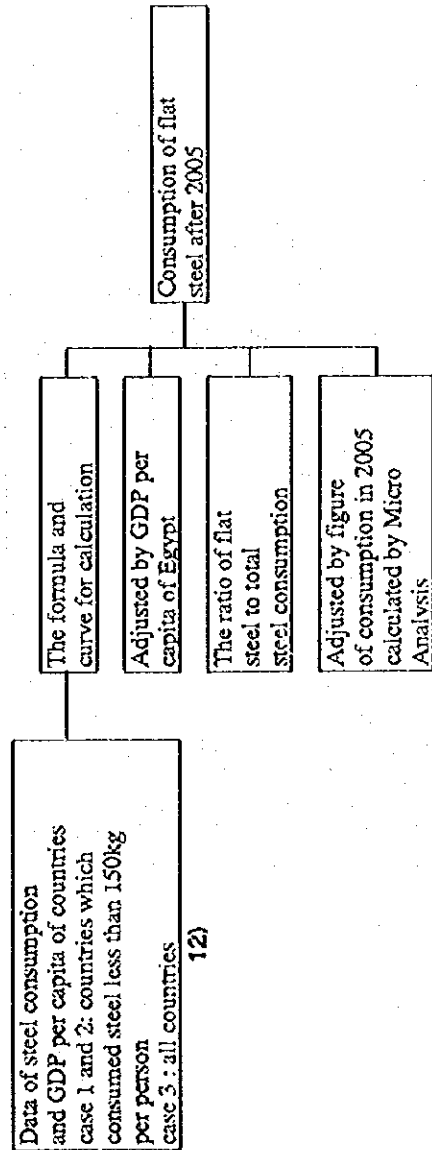
Demand structure in 2005

Micro Analysis (accumulated demand forecast of each consuming Ind.) to estimate of demand of flat steel in 2005

Present situation of flat steel consumption in Egypt



Macro Analysis(correlation analysis between GDP and Flat steel consumption per Capita of countries) for estimation of demand after 2005 4-2



The process of producing flat steel involves the use of natural gas to make sponge iron by reduction, continuous casting of the steel by the use of an electric furnace, hot rolling, and cold rolling, after which comes surface finishing. This produces hot- and cold-rolling flats and flats that have had surface finishing.

It is not necessary to newly install equipment for all these processes; the processes used are to be decided on the basis of the nature of demand for steel flat products. A minimum economic scale for each process will be determined by the nature of the process itself.

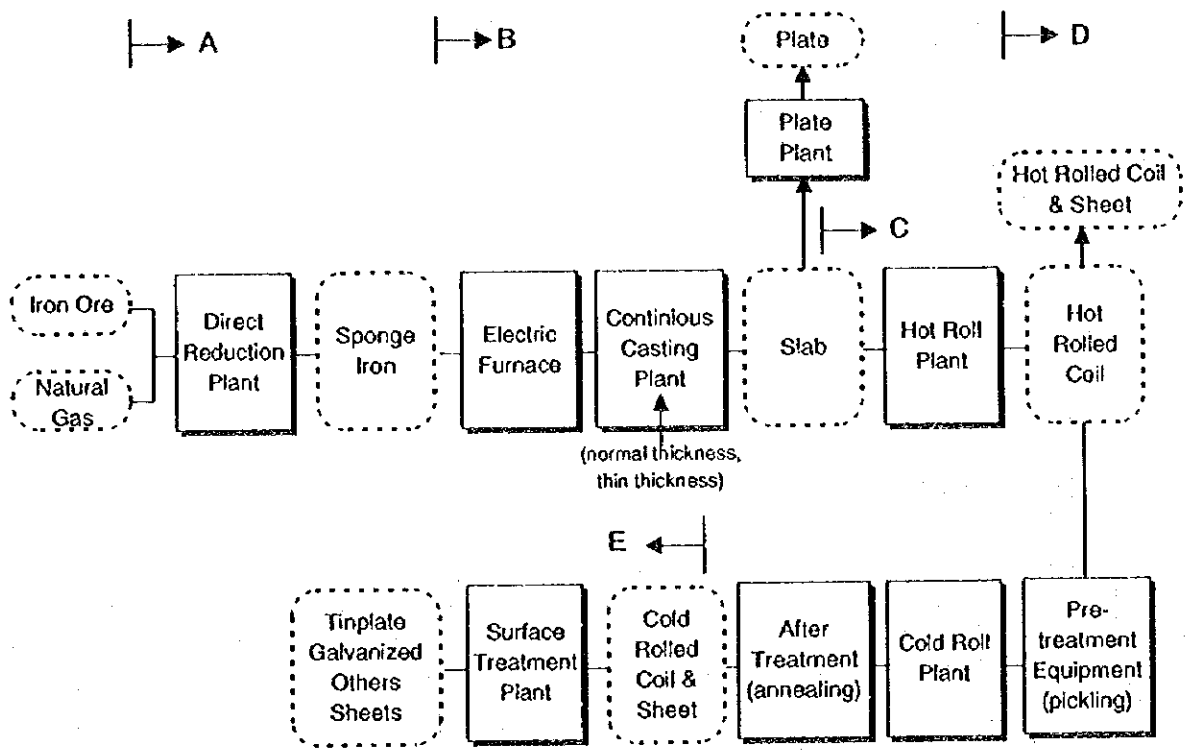
As a result of this study, it is concluded that there are no demand-related problems that would discourage investment in a hot rolling mill that would be of minimum economic scale (800,000 tons/year) even in the case of lowest growth rate and of EISCO's operations at present levels.

Regarding a cold rolling mill minimum economic scale, 300,000 tons/year, in the case of the high forecast for economic growth, even if EISCO continues production as at present, demand in 2005 (341,280 tons) would exceed the minimum scale. In the medium-growth case, demand in 2005 would be 272,221 tons. In this case, an additional export demand of 10% of the production could make the mill viable.

It is widely recognized that per capita steel demand rises rapidly after passing the 100kg mark. It is believed that around the year 2005 demand for steel flat products in Egypt will rise rapidly as per capita steel demand exceeds 100kg.

From these demand consideration, it is judged desirable to proceed with Phase 2.

FLAT STEEL PRODUCTION LINE



1. REVIEW OF THE NATIONAL ECONOMY AND INDUSTRY IN EGYPT

1-1. Recent Economic Conditions

The recent economic conditions in Egypt are characterized below.

- (1) The growth rate of GDP in terms of E£ is higher than that of in terms of US\$ due to the changes in the exchange rate (0.7 E£ /US\$ in 1988 and 3.392 E£ /US\$ in 1994). (See Table 1-1-1)
- (2) Examining the evolution of GDP growth, from 1983 to 1994, the average growth rate from 1983 to 1994 was 5.7% (59,553 million E£ in term of 1990 prices is increased to 108,517 million E£) and from 1988 to 1994 (stagnated period) was 3.8% (86,610 million E£ is increased to 108,517 E£). (See Table 1-1-1)
- (3) The drop of growth rate after 1987 is caused by the decline of oil price. Twice in 1991 and 1993 there arose extremely low growth, caused by the Gulf War, decrease of tourism due to the terrorism and the country's transition from a central planning economy to a market economy, which brought damages on the economic growth. After 1994 the Egyptian economy shows recovery and stability.
- (4) Sectoral overview shows that during 10 years (1985-94), there has been no remarkable changes except that the contribution to growth from oil and oil products decreased owing to the decline in the price of oil.
- (5) The industrial sector's growths stagnated until 1994, at present shows improvement. (Share of Mining & Industry in GDP during 1988-91 was 17.3% to 17.9% and 1992-94 was 16.6% to 16.7%. Growth rate of Mining & Industry in 1995/96 was 5.6% which was higher than previous years.)
- (6) The macroeconomic situation at present is summarized below (see Table 1-6-1).
 - 1) Inflation has become moderate (8.4% in 1995) and the budget deficit is stable (overall deficit was 1.5% of GDP in 95/96).
 - 2) Trade balance remains in deficit but the debt burden has been alleviated. Foreign reserves amount to US\$18 billion at the end of 1995.
 - 3) Privatization as well as foreign investment are being and will be intensively encouraged.
- (7) Considering all the related factors, the projections for three scenarios, low, medium and high growth of GDP, were settled and confirmed in the M/M dated June 26, 1996 as follows.
 - 1) Lowest case : GDP growth rate 4%
 - 2) Medium case : GDP growth rate 5.5%
 - 3) Highest case : GDP growth rate 1995-2005; 6.5%,
2005-2020; 8.5%

Table 1-1-1 EVOLUTION OF GDP GROWTH IN EGYPT

| (1) Gross Domestic Product in Egypt, GDP Deflator and Price Indexes | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---------------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| GDP in million of pounds | | | | | | | | | | | | |
| Current Prices | 25,895 | 31,547 | 37,240 | 42,553 | 51,500 | 61,600 | 76,800 | 96,100 | 111,200 | 139,100 | 157,300 | 175,000 |
| At constant 1990 Prices | 59,553 | 63,130 | 70,785 | 77,203 | 82,144 | 86,610 | 90,916 | 96,100 | 97,137 | 101,443 | 104,360 | 108,517 |
| Growth Rate (%)** | 6.4 | 6.0 | 12.1 | 9.1 | 6.4 | 5.4 | 5.0 | 5.7 | 1.1 | (4.4) | 2.9 | 4.0 |
| GDP Deflator (1990=100) | 43.5 | 50.0 | 52.6 | 55.1 | 62.7 | 71.1 | 84.5 | 100.0 | 114.5 | 137.1 | 150.7 | 161.3 |
| Wholesale Prices 1990=100 | 32.1 | 35.3 | 40.0 | 46.9 | 53.3 | 67.3 | 85.6 | 100.0 | 117.3 | 132.2 | 143.5 | |
| Changes* | 1.1584 | 1.0997 | 1.1331 | 1.1725 | 1.1985 | 1.2627 | 1.2719 | 1.1682 | 1.1790 | 1.1213 | 1.0855 | |
| Consumer Prices 1990=100 | 30.9 | 36.1 | 40.5 | 50.2 | 60.0 | 70.6 | 85.6 | 100.0 | 119.7 | 136.1 | 152.5 | 165.0 |
| Changes* | 1.1617 | 1.1683 | 1.1219 | 1.2395 | 1.1952 | 1.1767 | 1.2125 | 1.1682 | 1.1970 | 1.1370 | 1.1205 | 1.0820 |

Source: International Financial Statistics Yearbook 1995

Notes: || Break in series; data prior to the sign not comparable.

* Calculated

(2) Gross Domestic Product in US\$ (Total and Per Capita), and Population

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|-------------------------------|--------|--------|---------|--------|--------|--------|--------|--------|--------|------|------|
| At Current Prices (mil. US\$) | 44,638 | 52,311 | 582,314 | 62,932 | 87,299 | 65,260 | 43,871 | 33,166 | 40,898 | | |
| Per Capita (US\$) | 984 | 1,125 | 1,223 | 1,288 | 1,745 | 1,274 | 937 | 618 | 746 | | |
| At Constant 1990 Prices (A) | | | | | | | | | | | |
| (mil. US\$) | 36,288 | 38,027 | 39,017 | 39,994 | 41,553 | 42,799 | 43,871 | 44,878 | 45,012 | | |
| Growth Rate (%) | 6.0 | 4.8 | 2.6 | 2.5 | 3.9 | 3.0 | 2.5 | 2.3 | 0.3 | | |
| Population (B) (million) | 45.23 | 46.47 | 47.81 | 49.05 | 50.27 | 51.48 | 52.69 | 53.92 | 55.16 | | |
| Per Capita (A/B) (US\$) | 802 | 818 | 816 | 815 | 827 | 831 | 833 | 832 | 816 | | |

Sources: GDP at Current Prices, Per Capita GDP at Current Prices, GDP at Constant 1990 Prices (A):

Statistical Yearbook 1993 (UN)

Population: Monthly Bulletin of Statistics (UN)

(3) Exchange Rates

| | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Exchange Rates (Market Rate) | | | | | | | | | | | | |
| pounds/US\$ | 0.7000 | 0.7000 | 0.7000 | 0.7000 | 0.7000 | 0.7000 | 1.1000 | 2.0000 | 3.3300 | 3.3300 | 3.3704 | 3.3920 |

Source: International Financial Statistics Yearbook 1995

Note: Rate at the end of period

1-2. Development Policy

The pivots of Economic Reform Policy are shown below and the major targets of macroeconomic policy are summarized as follows:

- (1) Economic liberalization with regard to price mechanisms, trade and the international financial market.
- (2) Privatization and industrialization.
- (3) Encouragement of exports and improvement of the balance of payment.

PIVOTS OF ECONOMIC REFORM POLICY

| Liberalizing Prices & Trade | Controlling Overall Cash Demand | Promoting Private Sector | Liberalizing & Developing Public Business Sector | Encountering Social Impacts of Reform & Privatization |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> - Liberalizing interest rate - Liberalizing & unifying Egyptian pound - Liberalizing products - Liberalizing trade | <ul style="list-style-type: none"> - Expanding open-market operations - Amending provision - Amending liquidity - Organizing credit checks - Law of numbered accounts - Floating treasury bills - Sales tax | <ul style="list-style-type: none"> - Private sector - Arab & foreign investors | <ul style="list-style-type: none"> - Restructuring public sector companies - Separating ownership from administration - Privatization - Developing capital market - Activating role of banks | <ul style="list-style-type: none"> - Establishing the social development fund |

Source: Year Book 1994

The adoption of the past development plans have resulted in the following:

- (1) In the development plans during the 1980s and even in the Third Plan, infrastructure investment has been higher priority (Electricity, Construction and Social Service Sector). (See Tables 1-2-1 through 1-2-3.)
- (2) Wide fluctuation of growth rates was caused by unexpected international factors, but the yearly average growth rate targets were achieved as a whole.
- (3) The current Third Development Plan, to end in 1996/1997, has the following characteristics.
 - 1) The development investment in the private sector has been comparatively emphasized.
 - 2) Total investment was increased by 34% and the social service sector increased in share.

- 3) Industry has been remained in the same position as in the previous plan, but the business sector's share is remarkably high.

The features of the Fourth Development Plan are as follows.

- (1) The Fourth Development Plan has not yet been authorized or published. Its tentative plan includes an ambitious increase in development investment by 57% compared to the Third Plan and the amount is to almost equal (242 billion E£) the total of Second and Third Plan (115+154 billion E£).
- (2) The share of investment in the commodity sector in the plan will increase by 5.6%, while that in the industry subsector will rise 6.6%. On the other hand, the social service sector share will be decreased by 5.1%.

Table 1-2-1 TARGET & RESULT OF 1ST DEVELOPMENT PLAN (82/83-86/87)

(Units: L.E. mil, %)

| | Targeted Investment | Result | GDP targeted growth rate | Result |
|----------------------------|---------------------|---------------|--------------------------|------------|
| Commodity Sector | 17,539 | 28,768 | 8.5 | 6.2 |
| Agriculture | 1,678 | 3,125 | 3.7 | 3.5 |
| Mining & Industry | 8,617 | 13,375 | 10.3 | 9.1 |
| Petroleum | 1,337 | 7,152 | 12.2 | 7.7 |
| Electricity | 2,904 | 4,007 | 10.7 | 13.5 |
| Construction | 942 | 1,109 | 8.3 | 3.3 |
| Productive Services Sector | 7,147 | 14,555 | 7.2 | 7.1 |
| Social Services Sector | 10,165 | 12,355 | 8.1 | 8.0 |
| Total | 34,851 | 55,678 | 8.1 | 6.8 |

Source: Ministry of Planning

Table 1-2-2 TARGET & RESULT OF 2ND DEVELOPMENT PLAN (87/88-91/92)

(Units: L.E. mil, %)

| | Targeted Investment | Result | GDP targeted growth rate | Result |
|----------------------------|---------------------|----------------|--------------------------|------------|
| Commodity Sector | 24,185 | 62,136 | 5.8 | 4.9 |
| Agriculture | 3,502 | 8,907 | 4.1 | 3.3 |
| Mining & Industry | 12,191 | 25,742 | 8.4 | 6.8 |
| Petroleum | 1,114 | 12,743 | 2.3 | 2.9 |
| Electricity | 4,761 | 12,777 | 7.1 | 6.3 |
| Construction | 1,181 | 1,968 | 5.9 | 6.0 |
| Productive Services Sector | 7,228 | 25,306 | 5.6 | 5.6 |
| Social Services Sector | 14,405 | 27,483 | 6.2 | 6.0 |
| Total | 45,818 | 114,925 | 5.8 | 5.3 |

Source: Ministry of Planning

Table 1-2-3 TARGET & RESULT OF 3RD DEVELOPMENT PLAN (92/93-96/97)

(Units: L.E. mil, %)

| | Targeted Investment | (Public) | (Private) | GDP targeted growth rate |
|----------------------------|---------------------|-----------------|-----------------|--------------------------|
| Commodity Sector | 77,200 | (26,000) | (51,200) | 4.7 |
| Agriculture | 13,900 | (8,000) | (5,900) | 3.5 |
| Mining & Industry | 28,000 | (600) | (27,400) | 7.0 |
| Petroleum | 15,000 | (300) | (14,700) | 1.0 |
| Electricity | 17,700 | (17,000) | (700) | 6.5 |
| Construction | 2,600 | (100) | (2,500) | 7.2 |
| Productive Services Sector | 30,100 | (13,200) | (16,900) | 5.3 |
| Social Services Sector | 46,700 | (25,300) | (21,400) | 5.7 |
| Total | 154,000 | (64,500) | (89,500) | 5.1 |

Source: Ministry of Planning

1-3. Industrial Structure

The overall situation of the industry is as follows.

- (1) Tracking the evolution of industrial share in the economy, growth of the industry has stagnated during the 1980s and from 1990 until now.
- (2) As shown by the trade balance, the trade deficit due to mainly import of industrial goods partly offsets a net inflow from the Services Account.
- (3) The country's economy has forced to given higher priority to investment in economic and social infrastructure which was greatly damaged by the war.
- (4) All the commodity sector and productive services, and industries have been managed by public enterprises. In 1990 80% and in 1991 70% of all industrial production was produced in the public sector.

Industrial development will be accelerated by the following policy.

- (1) After adoption of the Economic Reform Policy in 1991, the country has promoted intensive privatization, particularly in manufacturing industries.
- (2) The government continues the industrial policy of encouraging private investment and furnishing several incentives to attract foreign investments.

There are some plans to develop the flat steel consuming industry, but it is not finalized and its effect can not be estimated.

Therefore, the rapid growth of the consuming industry is not considered in this study as mentioned in the M/M dated June 26 1996.

Table 1-3-1 SHARE OF SECTOR IN GDP

| | (Unit: %) | | | | | | | |
|--------------------------|-----------|-------|-------|-------|-------|-------|-------|-------|
| | 1985 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
| Agriculture | 16.6 | 20.7 | 20.1 | 19.7 | 19.3 | 16.6 | 16.5 | 16.5 |
| Mining & industry | 14.6 | 17.3 | 17.3 | 17.6 | 17.9 | 16.6 | 16.7 | 16.7 |
| Oil & oil products | 15.9 | 4.3 | 3.9 | 3.6 | 3.5 | 9.9 | 9.8 | 9.9 |
| Electricity | 0.7 | 1.3 | 1.3 | 1.4 | 1.4 | 1.7 | 1.7 | 1.7 |
| Construction | 4.5 | 4.9 | 5.0 | 5.0 | 5.0 | 5.1 | 5.1 | 5.1 |
| Transport, communication | 8.7 | 9.2 | 9.4 | 9.9 | 9.9 | 6.6 | 6.7 | 6.7 |
| Commerce, banking | 19.8 | 23.3 | 23.4 | 23.2 | 23.0 | 20.0 | 20.1 | 20.2 |
| Tourism | 1.1 | 1.1 | 1.3 | 1.5 | 1.5 | 1.8 | 1.9 | 1.5 |
| Administration | 17.8 | 17.9 | 18.0 | 18.1 | 18.2 | 16.8 | 17.1 | 17.2 |
| Public services | | | | | | | | |
| Total with others | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Ministry of Planning

Table 1-3-2 GROWTH RATE OF EACH SECTOR

| | (Unit: % p.a.) | | | | | | | | | |
|--------------------------|----------------|------|------|------|-------|------|------|-------|---------|--|
| | 1985 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 95/96 E | |
| Agriculture | 3.2 | 3.4 | 3.3 | 3.3 | 3.1 | 3.4 | 2.5 | 3.4 | 3.1 | |
| Mining & industry | 9.9 | 7.2 | 7.3 | 3.6 | 9.5 | 6.2 | 2.9 | 4.1 | 5.6 | |
| Oil & oil products | 10.6 | 6.4 | -2.8 | 2.7 | 4.1 | 4.3 | 1.6 | 3.7 | 2.5 | |
| Electricity | 4.2 | 7.9 | 9.5 | 3.1 | 5.2 | 6.0 | 3.4 | 4.1 | 4.6 | |
| Construction | 3.8 | 7.8 | 5.3 | 5.5 | 5.5 | 5.7 | 1.0 | 4.6 | 4.1 | |
| Transport, communication | 2.3 | 6.4 | 9.3 | 9.8 | 4.1 | 7.2 | 4.0 | 3.8 | | |
| Commerce, banking | 9.0 | 5.2 | 4.6 | 4.7 | 3.9 | 4.6 | 2.9 | 4.1 | 4.9 | |
| Tourism | 7.8 | 33.6 | 20.8 | 7.8 | -26.1 | 39.4 | 4.3 | -18.6 | 12.4 | |
| Administration | 9.1 | 6.1 | 6.4 | 6.4 | 5.5 | 5.6 | 4.0 | 4.4 | | |
| Public services | | | | | | | | | | |
| Total with others | 7.4 | 5.9 | 5.5 | 5.7 | 4.0 | 5.5 | 2.5 | 3.6 | 4.9 | |

Source: Ministry of Planning

Note: E; estimated

1-4. Present Status of Steel Industry

In Egypt, steel products are manufactured at three kinds of industrial facilities.

- (1) Integrated steel plants that manufacture products from pig iron or reduced iron to steel products
- (2) Steel making and rolling mills
- (3) Only rolling mills

Their capacities and production in 1992/93 are summarized in Table 1-4-1.

Flat steel is produced by only EISCO, and other companies produce long products but mainly bar steel. In fact, bar steel accounts for 73.4% of total steel product, or 1,980,000 out of 2,698,000 tons, while flat steel product totals 334,000 tons (12.4%) and section product 384,000 tons (14.2%).

Bar steel dominates additional capacity now being installed as well as planned for the future; when present installation as well as planned work are completed, a total capacity will amount to 2.2 million tons, while no expansion plan is known for flat steel. A special steel mill, the reported to have been started, of which is construction will manufacture mainly long products.

The emphasis on long products reflects the country's demand for steel products. It is notable that a large share of flat steel products is used for construction materials and for welded pipes, resulting in a large share for the construction industry in total consumption of steel products.

There are only two integrated steel plants in the country; EISCO produces pig iron at blast furnace, using locally produced iron ore, and ANSDK manufactures direct reduced iron from imported pellet by using natural gas. Suez Steel has a 600,000-ton billet production plan, but construction schedule details are not available.

Three companies have steel making and rolling mills, and 8 stand-alone rolling mills to produce bar steel. In addition, 6 companies plan to start bar steel production from ordinary steel materials.

In Egypt, scrap supply is very small and prices are high. There is an opportunity for supply of scrap or reduced iron products.

Table 1-4-1 STEEL PRODUCTION IN EGYPT

| Kind | Company | Steel 1,000ton/y | | Production 92/93 | | | Future Expansion | | Timing, etc. | |
|---------------------------|---------------------------------------------------------------------------------|----------------------|-------|------------------|-------|------|------------------|-------|--------------|----------------------|
| | | Type | Capa. | R/CBar | Sctn | Flat | Total | Steel | | Rolling |
| Integ. Public | Egyptian Iron & Steel (HADISOLBO) | 12TEAF | 36 | | | | | | | |
| | | 80TLD | 1,200 | 37 | 315 | 334 | 686 | 300 | 440 | 1997 Expansion |
| Integ. Semi Integ. Public | ANSDK National Metal Industry (NMI) Delta Steel Mil (DSM) Egyptian Copper Works | 70TEAF | 810 | 1,035 | | | 1,035 | | | Improve operation |
| | | 36TOHF | 90 | | F Bar | | 163 | | 50 | Rehabilitation |
| | | 35TEAF | 160 | 145 | 18 | | 145 | 50 | | CC Machines Install |
| | | 3-25TEAF | 95 | 112 | 33 | | 69 | 25 | | Ladle furnace |
| | | 30, 50TOHF | 165 | 62 | 7 | | 174 | 174 | | |
| Rolling Mill | El Baraka | | 174 | | | 36 | | | | |
| Private | El Shinnawy | | 36 | | | 13 | 10 | 150 | 89- | Italian Secondhand |
| | El Tamsah | EAF | 30 | 10 | 3 | | | 10 | Re-Bar | |
| | Youssy | | | 4 | 8 | | | 4 | | |
| | El Hoda | | | | | | | | | |
| | Kuta | | | 75 | | | | 75 | | |
| | El Haway | | | 240 | | | | 240 | 160 | Sadat city |
| | Others | | | 50 | | | | 50 | | |
| | Boshay | | | | | | | | 600 | Dec. '95 Sadat city |
| | Kouta | | | | | | | | 210 | Dec. '95 10 Ramadan |
| | Under Const. or Plan | Al Ezz Steel Re Bars | | | | | | | 600 | 300 |
| Port-said Co | | | | | | | | | 200 | Ramadan, under study |
| Moustafa Sarhan | | | | | | | | | 90 | 89- America Alex |
| Arco Steel | | | | | | | | 140 | Speci | 1998 Sadat, Korean |
| Suez Steel | | | | | | | | 600 | Billet | Mr. Sedki |
| Total | | | 2,586 | 1,980 | 384 | 334 | 2,698 | 2,304 | 2,340 | |

Source: Study Team

1-5. Regional Location of Industries

GOFI indicated the conditions for three candidate places which are summarized in the Table 1-5-1, but the Study Team could not visit them except Alexandria, which is referred to as the ANSDK below. Comparative analysis of three sites need to be carried out in Phase 2.

The situation of ANSDK is as follows:

- 1) Within the existing ANSDK factory site: It is possible to install only equipment for a hot rolling mill.
- 2) A southern neighboring lot: There is a site to the south of the current ANSDK factory across a highway, approximately 460,000m² (1,250m x 370m).
- 3) A northern neighboring lot: There is a very large site under development to the north of the current ANSDK factory, across a highway and adjacent to the port. This area was once prepared as the site for a coal-based power plant but the plan was canceled as natural gas was developed. There is a plan to use this area as a free-trade zone but still not to be finalized.
- 4) There is a jetty and sufficient natural gas and other utilities as mentioned in Table 1-5-2. And also there are supporting industries for the existing mills around the ANSDK area.

Table 1-5-1 CANDIDATE LOCATIONS

| | Alexandria | Suez (ADBeia) | SAFAGA |
|----------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------|
| Available area | South area 1,250m X 370m North area also attached sheet | Available | Available area |
| Steel Industry | ANSDK | Billet making plant with capacity of 600,000t | |
| Port & draught | 140,000 DWT Max. -20m | Port ADBeia Max. -14m | Max. -14m |
| NG availability | Capacity 92,000m ³ Consumption 40,000m ³ | Possible | No |
| Electric power | 2 X 220kv, 180MW-250MW | 220kv | Supply line extension is required |
| Industrial water | 930m ³ /Hr | Process water available Cooling water from sea | Same as Suez |
| Major consuming industries | | Shipyard | |
| Development policy | General advantage as new community Population density is high (6 million) | General advantage as new community Population density is low (less than 300,000) | General advantage as new community |
| Pollution problems | Resort area | Resort area | |

Source: GOFI

Table 1-5-2 INFRASTRUCTURE OF THE ANSDK AREA

| Items | Current main capacity | Description (Flexibility for expansion) |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Mineral jetty | Wharf: depth of water max. 20m to 200 thousand DWT Ships are able to arrive here. Stockyard: 23,000m ³ (for 5 months) Land transportation by BC and Rail Way | State-owned (operated by ANSDK) The current load factor is about 50% and it has flexibility for operational expansion. |
| Natural Gas | Supply capacity: 92,000Nm ³ /Hr Current ANSDK consumption: 5,000Nm ³ /Hr | It has energy enough to spare and no problems. |
| Electricity | Reception of electricity: 220KV, 180MVA x 2 | It is necessary to reinforce sub-station when expanding factories. (Possible) |
| Water for industrial use | Available line supply volume: 2,000m ³ /Hr Maximum amount of water drawn from rivers: 930m ³ /Hr | As there are many headwaters in this area, it is possible to deal with factory expansion by reinforcement of pumps. |
| Oxygen | Total flow: 400Nm ³ /Hr | It is necessary to reinforce oxygen plants. (Possible) |

Source: ANSDK

1-6. Natural Resources and Energy

The Study Team obtained information from "UNEP Greenhouse Gas Abatement Costing Studies Case Study on Egypt 1995". After, the Team also obtained electricity generation data and forecasts from GOFI.

Natural gas is produced at Abo El Garadiek, Abo Madi and Abo Keir and production increased from 1,616kt in 1980 to 6,110kt (296.7PJ) in 1990.

And now new gas fields at Delta and Matroh are under development and the production of natural gas is expected to reach 808PJ in 2020.

To utilize natural gas as fuel, for power generation, and as feedstock for chemical products and raw materials to make sponge iron, pipelines have been installed (at the approximate rate of 100km/y).

Expansion of the pipeline net work, and replacement of the existing pipeline (about 5%), will promise significant growth of demand for steel pipes.

NATURAL GAS

| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Crude refined (Mt) | 13.83 | 15.07 | 16.81 | 18.14 | 19.54 | 20.22 | 21.14 | 22.43 | 22.47 | 23.06 | 24.34 |
| Gas production (Kt) | 1,616 | 1,844 | 2,023 | 2,376 | 3,046 | 3,733 | 4,306 | 4,785 | 5,361 | 5,889 | 6,110 |

Source: UNEP Greenhouse Gas Abatement Costing Studies Case Study on Egypt 1995

NATURAL GAS PRODUCTION IN FUTURE

| | 1990 | 2000 | 2010 | 2020 |
|------------------|-------|-------|-------|------|
| Oil product (PJ) | 753.3 | 731.8 | 534.7 | 496 |
| Natural gas (PJ) | 296.7 | 514.4 | 693.6 | 808 |

PJ 10¹⁵

Source: UNEP Greenhouse Gas Abatement Costing Studies Case Study on Egypt 1995

2. MARKET ANALYSIS OF STEEL FLAT PRODUCTS

2-1. Major Consuming Industries for Steel Flat Products

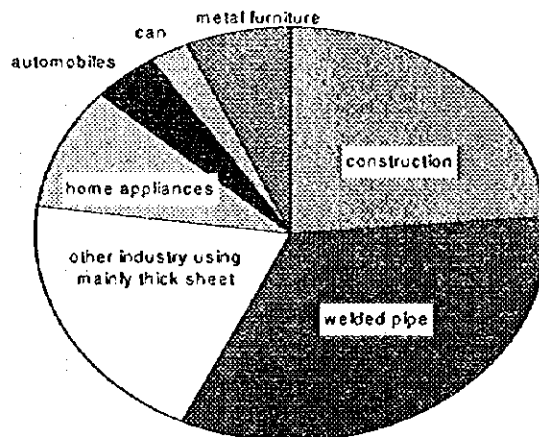
- Major consumers of flat steel products are composed of (1) industries where demand is mainly for plate and thick hot rolled products, including general steel structure and welded pipes, shipyards, gas cylinders, metal containers, railway vehicles, and boilers and (2) industries where demand is for sheet products, such as automobile, household appliance, canned food, and metallic furniture.
- In the Egyptian market for flat steel products, consumption of plate and thick hot rolled sheet products for use in construction materials and pipes is relatively large due to the scale of construction activities and of the oil/natural gas pipeline industries, while demand for cold rolled sheet products is comparatively small due to the limited production of consumer durable goods.

CONSUMPTION OF FLAT SHEET IN 1995

(Unit: ton)

| | construction | welded pipe | other ind. using mainly thick hot rolled sheet | home appliances | automobiles | can | metal furniture | total |
|-----------------------|----------------------------------|--------------------------------------|---------------------------------------------------------|-----------------------|---------------------------------------|-----------|-----------------------|---------|
| consumption | 176,350 | 246,889 | 148,048 | 72,249 | 31,787 | 17,279 | 50,000 | 742,602 |
| size of flat steel | hot rolled sheet 98% >3 mm | hot rolled 60% <3 mm 40% >3 mm | plat & hot rolled sheet 60% >3 mm | cold rolled < 3 mm | hot rolled & cold rolled < 3 mm | tin plate | cold rolled < 3 mm | |

Note: Other ind. using mainly thick hot rolled sheet includes shipyards, gas cylinders, metal containers, railway vehicles, boilers and other governmental companies.



- The factories for manufacturing consumer durable goods are mainly located at Cairo, Giza, Alex and Sharkia. (Table 2-1-1)

Table 2-1-1 SOME ENGINEERING INDUSTRIES USING STEEL FLAT (By location)

| Main product | Number of companies/factories/shops | | | | | | | | | | | Total | |
|----------------------------------|-------------------------------------|-----------|-----------|-----------|----------|-----------|-----------|-----------|----------|-------------|--|-------|------------|
| | Cairo | Giza | Alex | Sharkia | Kharbia | Behira/OT | Kallobia | Dakalia | Menoufia | Upper Egypt | | | |
| Air conditioners | 4 | 4 | | 6 | | | | | | | | | 14 |
| Metal furniture | 98 | 20 | 10 | 10 | 3 | 2 | 7 | 5 | 4 | 8 | | | 167 |
| Refrigerators & heaters | 14 | 14 | 7 | 12 | | 2 | 7 | | | | | | 56 |
| Washing machines & deep freezers | 8 | 15 | 10 | 12 | 1 | 1 | 3 | 2 | 1 | 4 | | | 57 |
| Gas cookers & ovens | 1 | 4 | 2 | 7 | | | 3 | | | | | | 17 |
| Automobile parts and auto | 31 | 13 | 8 | 7 | 1 | 3 | 3 | 1 | | 2 | | | 69 |
| Tanks, boilers & metal sheet | 12 | 4 | | 7 | | 2 | 4 | 5 | | | | | 34 |
| Other metal sheet | 5 | 1 | 1 | 1 | | 1 | 1 | 2 | | | | | 12 |
| Total | 173 | 75 | 38 | 62 | 5 | 11 | 28 | 15 | 5 | 14 | | | 426 |

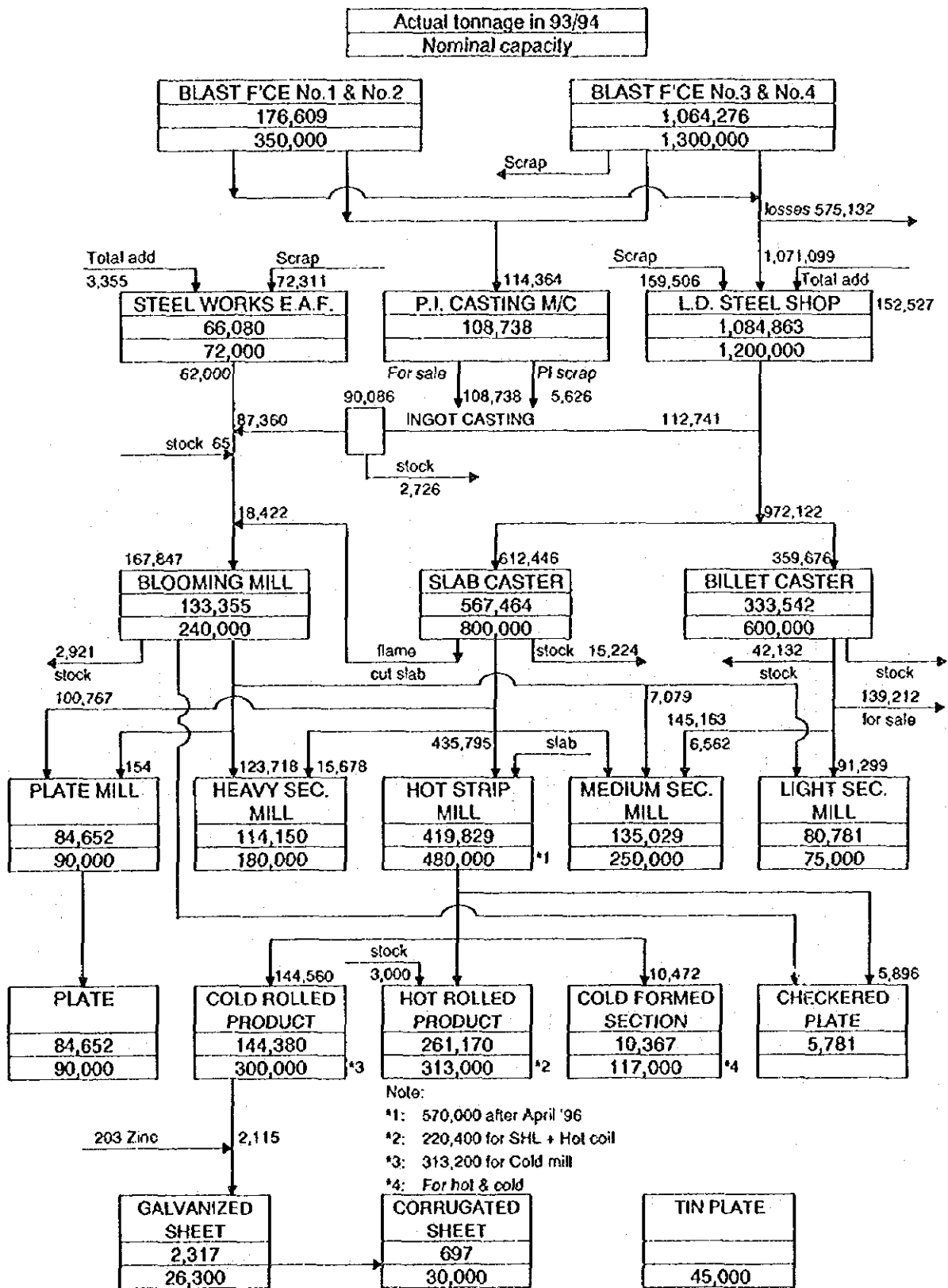
Source: GOFI

2-2. Existing Production Facilities for Steel Flat Products in Egypt

- In Egypt, there is only one flat steel manufacturer, Egyptian Iron & Steel Co. (EISCO or HADISOLB).
- The company has its own mines, and uses its own iron ore and coke purchased from a company to produce pig iron by using 4 blast furnaces.
- The production lines consist of E.A.F., P.I casting, and an L.D. steel shop, followed by blooming mill, slab caster, billet caster, and plate mill, heavy sec mill, medium sec mill, light sec mill, hot strip mill, cold strip mill, and surface treatment plant.
- The annual capacities of major plants are as follows. (blast furnace: 1,650,000 tons, plate mill: 90,000 tons, hot strip mill: 480,000 tons (after 1996, 570,000 tons), and cold strip mill: 300,000 tons).
- The company has undergone many difficulties in recent years, including poor quality of the ore grades, excessive employment, high interest payments due to massive loans made in the past, and a limitation of width (1 meter) in the hot strip mill product. The company has to take drastic measures to improve the situation, such as reduction of debt and effectiveness investment to improve production and product quality.
- Taking account of similar facilities in Japan, EISCO's hot strip mill can increase its capacity to 100,000 tons/month (1,200,000 tons/year).
- Within restrictions due to the 1m-wide production line of the hot strip mill, specialization in galvanized steel, tin plates, stainless steel, and silicon steel, mainly width less than 1 meter, may be available option.
- The future of EISCO is unknown, and it is assumed in M/M dated on June 26, 1996 that the present production will continue in future.

Figure 2-2-1 PROCESS & MATERIAL FLOW

tonnes/year



Source: EGITALEC

2-3. Production Mix and Main Specification of EISCO

The plate mill produces plates whose maximum size is 100mm thickness and 1,500mm width while the hot rolled mill produces sheets whose maximum size is 8mm thickness and 1,000mm width and the cold rolled mill produces sheets whose maximum size is 3mm thickness and 1,050mm width.

1) Plate

Steel grade : DIN 17100 ST-37, ST-34, ST-50 & ST-52

Product size : 8.0/100mm thick x 1,250/1,500mm wide x 3.6 & 9m long

2) Hot rolled sheet & coil

Steel grade : DIN 1614 & 1623, ST-33, ST-37 & ST-44

ST-37 : 89%, ST-44 : 10%, ST-33 : 1%

Product size mix (%)

| Width (mm) | w < 600 | 600 ≤ w < 900 | 900 ≤ w ≤ 1,050 |
|-----------------|---------|---------------|-----------------|
| Thickness (mm) | | | |
| t < 3.0 | | 2.5 | 43 |
| 3.0 ≤ t < 4.75 | | 1.5 | 38 |
| 4.75 ≤ t < 8.00 | | | 15 |

Source: EGITALEC

3) Cold rolled sheet & coil

Steel grade : DIN 1614, ST-12 & ST-13

ST-12 : 50%, ST-13 : 50%

Product size mix (%)

| Width (mm) | w < 600 | 600 ≤ w < 900 | 900 ≤ w ≤ 1,050 |
|----------------|---------|---------------|-----------------|
| Thickness (mm) | | | |
| t < 0.5 | | | 3 |
| 0.5 ≤ t < 1.0 | | | 51 |
| 1.0 ≤ t < 3.0 | | | 46 |
| t ≥ 3.0 | | | 0 |

Source: EGITALEC

4) Cold formed section

Steel grade : DIN 1614, ST-37

Product size : 3.0/6.0mm thick x 40, 50, 7mm equal channel : 10%

3.0/6.0mm thick x 40/40 x 40/60mm unequal channel : 90%

5) Galvanized sheet

Steel grade : DIN 1514/1975, GOST 3680/1957

Product size : 0.5/1.5mm thick x 640/835mm wide x 1,420/2,000mm long

2-4. Past Production Trends

According to information furnished by BISCO and EGITALEC, BISCO's production trends between 1988/89 and 1994/95 are as follows:

- Plate production: 80,158 tons~88,146 tons, for nominal capacity of 90,000 tons/y.
- Hot rolled products: Consistently increased yearly with wide fluctuation between 200,000 tons/y and 290,000 tons/y, for nominal capacity of 313,000 tons/y.
- Cold rolled products: Yearly variation ranging between 110,000 tons/y and 165,000 tons/y, for nominal capacity of 300,000 tons/y.
- Cold formed sections: Ranging between 9,659 tons and 13,657 tons, for nominal capacity of 117,000 tons/y.
- Galvanized sheet: Ranging between 916 tons and 8,179 tons/y for nominal capacity of 26,300 tons/y, declining yearly to below 1,000 tons/y in 1994/95.

PRODUCTION ACHIEVEMENT IN TONS

(Unit: ton)

| Year | Plate | Hot rolled product | Cold rolled product | Cold formed section | Galvanized sheet | Total |
|-------|--------|--------------------|---------------------|---------------------|------------------|---------|
| 88/89 | 84,723 | 197,911 | 124,101 | 13,657 | 4,708 | 425,100 |
| 89/90 | 87,651 | 208,027 | 110,676 | 9,659 | 6,238 | 422,251 |
| 90/91 | 82,916 | 241,638 | 142,142 | 13,311 | 8,179 | 488,186 |
| 91/92 | 80,158 | 221,505 | 165,324 | 10,218 | 6,602 | 483,807 |
| 92/93 | 88,146 | 248,562 | 115,018 | 11,606 | 3,064 | 466,396 |
| 93/94 | 84,652 | 261,170 | 133,903 | 10,367 | 2,317 | 492,409 |
| 94/95 | 83,332 | 289,072 | 160,863 | 12,573 | 916 | 546,756 |

Source: EGITALEC

Production other than flat steel in 1993/94 is summarized as follows.

| | Nominal Capacity (tons) | Production (tons) |
|----------------------|-------------------------|-------------------|
| Heavy section steel | 180,000 | 114,150 |
| Medium section steel | 250,000 | 135,029 |
| Light section steel | 75,000 | 80,781 |

Source: EGITALEC

(Unit: ton)

| | 88/89 | 89/90 | 90/91 | 92/93 |
|----------------------------------------|---------|---------|---------|---------|
| EISCO plate + Hot rolled + Cold rolled | 406,735 | 406,354 | 466,696 | 451,726 |
| IISI total flat | 514,000 | 600,000 | 422,000 | 516,000 |

Source: EGITALEC

2-5. Import and Export

Import and export data for 1991 through 1995 were obtained from CAPMAS, but continuity is questionable due to a major change in classification of products, and CAPMAS system modification.

Especially difficult to explain is the drastic increase of hot rolled coils and sheet imports from 56,388 tons in 1994 to 201,038 tons in 1995. Therefore, import figures for both 1994 and 1995 are assumed at 128,713 $[(56,388 + 201,038) \times 1/2 = 128,713]$ tons.

| ITEMS | YEAR | | | | |
|----------------------------------------------|------|------|------|------|------|
| | 1991 | 1992 | 1993 | 1994 | 1995 |
| FLAT ROLLED PRODUCTS (x10 ³ tons) | | | | | |
| IMPORT | 217 | 177 | 180 | 254 | 325 |
| TIN PLATE (imported turned out lately) | 46 | 47 | 57 | - | - |
| TOTAL ① | 263 | 224 | 237 | 254 | 325 |
| EXPORT ② | 29 | 72 | 51 | 24 | 38 |
| NET IMPORT [① - ②] | 234 | 152 | 186 | 230 | 287 |
| WELDED PIPES | | | | | |
| IMPORT ① | 63 | 40 | 32 | 35 | 44 |
| EXPORT ② | 25 | 15 | 9 | 2 | 3 |
| NET IMPORT [① - ②] | 38 | 25 | 23 | 33 | 41 |

Source: CAPMAS

1995

(Unit: ton/year)

| Thickness (mm) | Import | Export | Net Import |
|----------------|---------|--------|------------|
| Plate & Hot | | | |
| ① t ≤ 3.0 | 47,294 | 37,437 | 9,857 |
| ② t > 3.0 | 93,928 | 271 | 93,657 |
| Sub total | 141,222 | 37,708 | 103,514 |
| Cold | | | |
| ③ t ≤ 3.0 | 116,815 | 0 | 116,815 |
| ④ t > 3.0 | 8,215 | 0 | 8,215 |
| Sub total | 125,030 | 0 | 125,030 |
| ① + ③ | | | 126,672 |
| ② + ④ | | | 101,872 |
| Coated | | | |
| t ≤ 3.0 | 58,615 | 0 | 58,615 |
| Total | 324,867 | 37,708 | 287,159 |

Note: Estimated by the Study Team

2-6. Tendency Sales Price of Steel Flat Products

At present, Egypt pursues generally its economic policies based on the market economy and thus the prices of steel materials are governed by the international market.

Egypt imposes a 10 - 30% tariff on imported steel materials except for those imported from certain countries (including Saudi Arabia and Libya). In addition to import duties, a 10% sales tax, a 3% service tax, a 1% with-holding tax and a 2% miscellaneous service tax are imposed. Importers of steel materials have to pay 36% (in case of 20% tariff) extra in all. Note that the prices to be determined under the present study are not purchase prices of customers, but ex-factory prices.

In this case, if the factory mainly serves the domestic market, the import price plus 10 - 30% is considered to be a plausible price level.

The Team studied the prices of flat sheet from the three sources.

The first source is the import statistics of flat steel to Egypt. It is summarized below and shows that the unit value of steel plates and sheets was sharply fluctuated.

The second source is the factories visited, and the prices of imported products are higher than local made ones.

The third source is Metal Bulletin, and there is a wide variation according to the kind of product.

IMPORTS UNIT VALUE OF STEEL PRODUCTS IN EGYPT

| Egypt | | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|-------|-----------------------------|------|-------|------|------|------|-------|-------|-------|------|-------|------|
| Code | Commodity | | | | | | | | | | | |
| 674 | IRON SRL UNV. PLATE, SHEET | 464 | 420 | 432 | 569 | 641 | 858 | 661 | 602 | 569 | 591 | 571 |
| 6744 | IRON SRL HWY PLATES, ROLLER | 443 | 297 | | | | | | | | | |
| 67441 | -OF IRON OR SIMILE SRL | 443 | 297 | | | | | | | | | |
| 6747 | TINNED PLATES, SHEETS | 527 | 654 | | | | | | | | | 608 |
| 6749 | OTH IRN STL PLATES, SHEET | 479 | 400 | 502 | 564 | 651 | 905 | 600 | 609 | 539 | 591 | 494 |
| 67491 | -OF IRON OR SIMILE STL | 451 | 419 | 515 | 508 | 622 | 763 | 561 | 504 | 492 | 503 | 468 |
| 67492 | -OF HIGH CARBON STEEL | 630 | 1,052 | 470 | 936 | 955 | 1,729 | 1,796 | 1,557 | 909 | 1,328 | |

Sources: UN International Trade Statistics Yearbook 1993 and 1994

PRICES OF STEEL COIL IN WELDED PIPE COMPANY

| | Quantity in tons | Price in L.E. | Unit Value in L.E. | Unit Value IJSS |
|----------------------|------------------|---------------|--------------------|-----------------|
| Imported steel coils | 34,037 | 45,446,151 | 1335.2 | 393.6 |
| Local steel coils | 63,594 | 69,471,975 | 1092.4 | 322.1 |

Source: Field survey

WORLD STEEL PRICES

| West Europe | | Brussels | | Black Sea/Baltic Sea | | Far East | |
|------------------------------|-----------|------------------|-----------|----------------------|--------------|----------------------|--------------|
| Reinforcing rounds | 265 - 280 | Rebars plain | 220 - 230 | Pig iron | 135 - 140 | Pig iron | nom |
| Merchant bars | 295 - 305 | Merchant bars | 240 - 250 | Billets | 190 - 200 | Billets | 210 - 215 |
| Wire rod (mesh) | 265 - 275 | Wire rods | 250 - 260 | Rebars | 226 - 230 | Rebars | 235 - 240 |
| Wire rod (drawing) | 275 - 300 | Heavy sections | 340 - 350 | Merchant bars | 245 - 250nom | Merchant bars | 245 - 250nom |
| Sections (300 - 600mm) | 385 - 400 | Hbl coil | 300 - 320 | Wire rods (mesh) | 223 - 227 | Wire rods (mesh) | 235 - 240 |
| Sections (over 600mm) | 470 - 500 | Heavy plates | 430 - 450 | Sections | nom | Sections | 300 - 325 |
| Heavy plates (over 10mm) | 430 - 440 | CR coil | 400 - 420 | Slab | 180 - 195 | Slab | 210 - 215 |
| Medium plates 3 - 10mm (str) | 350 - 380 | Galvanized sheet | 530 - 550 | Heavy plates (10 - 5 | 230 - 235 | Heavy plates (10 - 5 | 250 - 255 |
| Universal plates | nom | | | HR coil | 215 - 245 | HR coil | 230 - 255 |
| Chequer plates | nom | | | CR coil | 315 - 335 | CR coil | 340 - 355 |
| HR coil (dry) | 270 - 290 | | | | | | |
| CR coil | 370 - 390 | | | | | | |
| Galvanized coils | 430 - 450 | | | | | | |
| Electro-zinc coils | 600 - 630 | | | | | | |

Source: Metal Bulletin

3. STUDY ON THE CONDITIONS OF NEIGHBORING COUNTRIES AND PROJECTION OF EXPORT

Export from Egypt to neighboring countries needs to be viewed from two perspectives; neighboring countries as export markets, and neighboring countries as competitors in export.

Neighboring countries that import relatively large amounts of total universal plates and sheets are three EU countries - Spain, France, and Italy - and Turkey. These countries import more than 1 million tons each annually. At the same time, all the countries except for Turkey export similar amounts.

The current iron and steel production capacity in Europe is considered to be excessive, as additional capacity cutbacks of 30 million tons in crude steel and 26 million tons in hot rolled steel (later reduced to 19 million tons) were proposed in 1993.

EU publicly advocates free trade in principle, but in practice, it controls imports in form of the import ceiling for steel materials, the import surveillance system, generally referred to as the double license system, and voluntary restrictions by export countries.

Turkey joined the EU tariff union under approval in 1995 and receives tariff treatment similar to that covering EU countries. This has exposed the country to intensive competition with EU countries. Tariff rates on steel materials imported are 18% for bar steel and 4-10% for other products.

Other than Spain, France, Italy, and Turkey, countries importing large quantities of flat steel products are Egypt, Iran, Saudi Arabia, and Libya.

Steel materials consumed in Iran are dominated by construction use including oil and gas industries. The Government of Iran has been taking various measures to improve self-sufficiency, including construction of a DR-type sheet mill and addition of a sheet production line in Isfahan in 1993, which are expected to raise the degree of self-sufficiency in near future. Partly due to the shortage of foreign currency, the country controls all the imports through a foreign currency quota system.

Saudi Arabia uses 75% of its steel materials consumption for construction purposes. The country has traditionally produced steel bar only and has entirely imported flat steel products. Today, flat steel production projects using DR, electrical furnace, and thin slab are under way to maintain a certain level of self-sufficiency, and total capacity is expected to reach 1.7 million tons, which far exceed the current amount of imports by the country and major portions will be exported.

Apparent consumption of crude steel in Libya is relatively high at 278kg per capita, which far exceed supply capacity of existing mills (self-sufficiency rate of 70%) to result in a large amount of imports. Nevertheless, the country has highly prospective iron ore resources in the central part, and together with rich reserves of natural gas required for the direct reduction process, it is working with a project aiming at significant capacity expansion.

Other neighboring countries consume very small amounts of steel materials.

The above analysis indicates that it is very difficult to establish a viable plan to export large quantities of flat steel products from Egypt. Feasible options are limited to small-scale exports to neighboring countries which consume small amount with reasonable price or exports to major importing countries to make up the gap with low price.

Table 3-1 IMPORTS/EXPORTS OF STEEL UNIVERSALS, PLATES AND SHEETS

| Country | Imports /Exports | Year | 674 | | | | | | | | | | | |
|--------------|------------------|------|------------|----------------------|---------|---------------------|--------|---------------------|-----------|---------|-----------------------|----------------------|-------------------------|----------------------|
| | | | 6741 | 6744 | 6745 | 6746 | 6747 | 6749 | 67491 | 67492 | | | | |
| | Total | | Universals | Heavy Plates, Rolled | 67441 | Med. Plates, Rolled | 67454 | Thin Plates, Rolled | 67461 | 67463 | Tinned Plates, Sheets | Other Plates, Sheets | of Iron or Simple Steel | of High Carbon Steel |
| Egypt | Imports | 1994 | 181,055 | | | | | | | | 49,999 | 59,420 | 44,165 | |
| | Exports | | 23,236 | | | | | | | | | 4,790 | 264 | |
| Iran | Imports | 1993 | (700,000)* | | | | | | | | | | | |
| Saudi Arabia | Imports | 1992 | 763,591 | 500,709 | 160,027 | | | | | | | | | |
| Algeria | Imports | 1994 | 100,924 | 16,674 | 16,571 | | | 32,897 | 31,155 | | 27,012 | 7,635 | 6,752 | |
| Libya | Imports | 1991 | 92,539 | | | | | | | | | | | |
| | Exports | 1990 | 51,953 | | | | | | | | | | | |
| Spain | Imports | 1994 | 1,543,607 | | | | | 423,309 | 441,789 | 200,638 | | 583,392 | 579,389 | |
| | Exports | | 1,713,135 | 319,112 | | | | 647,475 | | | | 490,486 | 475,458 | |
| France | Imports | 1994 | 3,977,608 | | | | | 1,174,227 | | | | 1,241,836 | 1,227,419 | |
| | Exports | | 4,322,690 | | | | | 1,432,482 | 1,106,198 | | | 1,623,373 | 1,546,099 | |
| Italy | Imports | 1994 | 3,685,487 | | | | | 1,626,716 | 1,289,331 | | | 973,289 | 961,340 | |
| | Exports | | 2,420,597 | | | | | | | | | | | |
| Turkey | Imports | 1994 | 808,367 | 137,927 | | 148,451 | | 415,253 | 361,669 | 51,052 | 52,239 | | | |
| | Exports | | 105,840 | | | | | | | | | | | |
| India | Imports | 1994 | 825,011 | 390,967 | 392,758 | 154,091 | 78,887 | | | | | | | |
| | Exports | | | | | | | | | | 112,098 | | | |
| Thailand | Imports | 1994 | 2,440,486 | 558,955 | 541,106 | | | 1,322,035 | 1,242,646 | 73,297 | | 369,399 | 367,212 | |
| Korea, RP | Imports | 1994 | | 1,000,697 | 981,309 | | | 1,890,797 | 1,738,592 | 152,197 | | 1,031,170 | 1,019,209 | |
| | Exports | | | | | | | | | | | | | |
| Japan | Imports | 1994 | 2,462,195 | | | | | 4,406,582 | 3,767,648 | | | 3,535,717 | 2,855,898 | |
| | Exports | | 11,358,000 | | | | | | | | | | | |

Note: * Total flat products (Source: IISI)

Sources: UN International Trade Statistics Yearbook 1994

4. DEMAND SURVEY OF STEEL FLAT PRODUCTS

4-1. Direct and Indirect Steel Flat Products Consumption

- Apparent consumption of flat steel estimated from actual production of EISCO and the import and export quantities obtained from CAPMAS for 1991 to 1995 are as follows.

(Unit: ton)

| 1991 | 1992 | 1993 | 1994 | 1995 |
|---------|---------|---------|---------|---------|
| 722,186 | 635,807 | 652,396 | 722,707 | 833,915 |

- Apparent consumption based on the above by thickness and width in 1995 is as follows.

(Unit: ton)

| | < 1,500mm | > 1,500mm | Total |
|-----------------------------------|-----------|-----------|---------|
| $t \leq 3\text{mm}$ | 346,635 | - | 346,635 |
| $24\text{mm} \geq t > 3\text{mm}$ | 355,885 | 50,335 | 406,220 |
| $t > 24\text{mm}$ | 10,214 | 11,315 | 21,529 |
| Non coated Sub Total | 712,734 | 61,650 | 774,384 |
| Coated | 59,531 | - | 59,531 |
| Total | 772,265 | 61,650 | 833,915 |

Apparent consumption by thickness and width (Table 4-1-1) is calculated by using total apparent consumption and the amount consumed by individual sectors.

The amount consumed by individual sectors (major consuming industries consists of construction, shipyard, welded pipe, gas cylinder, metal container, railway, boiler, automobile, home appliance, can, metal furniture and other governmental company) were obtained in the second field survey and from the information of GOFI dated Sept. 30th, 1996.

The difference between apparent consumption and the total consumed amount of individual sector is classified as "others".

- Apparent consumption based on statistics of IISI is as follows.

(Unit: ton)

| 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 582,000 | 612,000 | 513,000 | 577,000 | 657,000 | 592,000 | 715,000 | 801,000 | 604,000 | 725,000 | 602,000 |

The figures from 1991 to 1994 are different from the apparent consumption obtained from CAPMAS and EISCO but the total amount during the period is almost the same.

- Indirect consumption of flat steel is divided into two categories. One is imports of part for assembling (body of passenger cars and jeeps) and the other is imports of automobiles and home appliances as complete units.

Indirect imports of flat steel by imports of body of passenger cars and jeeps in 1995 are as follows.

| | Production (Units) | Unit consumption of flat steel (Tons) | Flat steel imported (Tons) |
|---------------|--------------------|---------------------------------------|----------------------------|
| Passenger car | 19,872 | 0.3 | 5,961.6 |
| Jeep | 2,000 | 0.5 | 1,000 |

The required annual production volume for making body is around 30,000 units. It seems very difficult to manufacture of body for passenger cars and jeep in the near future in Egypt.

- Imports of finished automobiles and home appliances based on CAPMAS data are as follows.

(Unit: sets)

| | 1991 | | | 1992 | | | 1993 | | |
|-------------------|---------|--------|------------|--------|--------|------------|--------|--------|------------|
| | Import | Export | Net import | Import | Export | Net import | Import | Export | Net import |
| Refrigerator | 299,777 | 6,981 | 292,796 | 81,274 | 2,370 | 78,904 | 28,221 | 759 | 27,462 |
| Washing m/c | 54,838 | 1,029 | 53,753 | 51,135 | 251 | 50,884 | 60,144 | 821 | 59,323 |
| Motor vehicle | 21,014 | 0 | 21,014 | 13,630 | 2 | 13,628 | 19,428 | 37 | 19,391 |
| Trucks | 11,358 | 12 | 11,346 | 1,710 | 139 | 1,571 | 1,543 | 17 | 1,526 |
| Cruise ship | 127 | 0 | 127 | 359 | 22 | 337 | 475 | 27 | 448 |
| Welded pipe (ton) | 63,000 | 25,000 | 38,000 | 40,000 | 15,000 | 25,000 | 32,000 | 9,000 | 23,000 |

Table 4-1-1 APPARENT CONSUMPTION BY SIZE (1995)

(Unit: Ton/year)

| | (1) Construction | | (2) Shipyard | | (3) Welded Pipe | (10) Gas Cylinder | (11) Metal Container | (9) Railway | (8) Boiler | (5) Auto | (4) Home Appliance | (6) Can | (7) Furniture | (12) Other Governmental | Others | | Total | |
|----------------------|------------------|--------|--------------|--------|-----------------|-------------------|----------------------|-------------|------------|----------|--------------------|---------|---------------|-------------------------|--------|---------|--------|---------|
| | <1,500 | >1,500 | <1,500 | >1,500 | | | | | | | | | | | <1,500 | >1,500 | | <1,500 |
| t ≤ 3mm | 2,900 | | 2,900 | 6,000 | 148,133 | | | 500 | 0 | 11,823 | 65,090 | | 50,000 | 4,000 | 58,189 | 346,635 | 0 | 346,635 |
| 3mm < t ≤ 24mm | 130,050 | 23,000 | 153,050 | 9,400 | 96,756 | 48,960 | 10,000 | 5,324 | 1,035 | 19,964 | 657 | | | 21,000 | 10,874 | 355,885 | 50,335 | 406,220 |
| t > 24mm | 9,400 | 11,000 | 20,400 | | | | | 514 | 315 | | | | | 300 | 0 | 10,214 | 11,315 | 21,529 |
| Non-coated Sub Total | 142,350 | 34,000 | 176,350 | 15,400 | 246,889 | 48,960 | 10,000 | 6,338 | 1,350 | 31,787 | 65,747 | 0 | 50,000 | 26,200 | 69,063 | 712,734 | 61,650 | 774,384 |
| Coated | | | | | | | 13,500 | | | | 6,502 | 17,279 | | | 22,250 | 46,031 | | 59,531 |
| Total | 142,350 | 34,000 | 176,350 | 15,400 | 246,889 | 48,960 | 23,500 | 6,338 | 1,350 | 31,787 | 72,249 | 17,279 | 50,000 | 26,200 | 91,313 | 758,765 | 61,650 | 833,915 |

DATA SOURCE:

- (1) Table 2-1-2 (p2-5)
- (2) Table 2-1-8 (p2-9)
- (3) Table 2-1-9 (p2-11)
- (4) Table 2-1-10 (p2-15)
- (5) Table 2-1-17-2 (p2-19)
- (6) Table 2-1-18 (p2-20)
- (7) Table 2-1-19 (p2-21)
- (8) Table 2-1-21 (p2-22)
- (9) Table 2-1-22 (p2-23)
- (10) Table 2-1-24 (p2-24)
- (11) Table 2-1-25 (p2-25)
- (12) Table 2-1-26 (p2-26)
- (13) Chapter 2-5-3 (p2-33)
- (14) Chapter 2-4-2 (p2-31)

| | Non coated ≤3mm | Total | Coated ≤3mm | Total |
|------------|-----------------|---------|-------------|---------|
| Import(13) | 126,672 | 228,544 | 58,615 | 287,159 |
| Local(14) | 219,963 | 325,877 | 916 | 546,756 |
| Total | 346,635 | 427,749 | 59,531 | 833,915 |

DISTRIBUTION OF SHEET ≤3mm thickness

| | HR | CR | Total |
|------------------|---------|---------|---------|
| Construction | 2,900 | 0 | 2,900 |
| Shipyard | 6,000 | | 6,000 |
| Welded pipe | 148,133 | | 148,133 |
| Railway | 500 | | 500 |
| Automobile | 1,495 | 10,328 | 11,823 |
| Home appliance | 0 | 65,090 | 65,090 |
| Furniture | 0 | 50,000 | 50,000 |
| Other Government | 1,000 | 3,000 | 4,000 |
| Others | 0 | 58,189 | 58,189 |
| Total | 160,028 | 186,807 | 346,635 |
| share % | 46% | 54% | 100% |

In Main Report

Table 4-1-2 APPARENT CONSUMPTION BASED ON IISI

| | (Unit: 1,000 ton) | | | | | | | | | | |
|----------------------------------------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
| PRODUCTION | | | | | | | | | | | |
| Iron ore | 1,955 | 2,056 | 1,974 | 2,122 | 2,274 | 2,461 | 2,432 | 2,371 | 2,062 | 2,409 | 2,460 |
| Sinter | ... | ... | 1,768 | 1,893 | 1,927 | 1,902 | 1,891 | 2,086 | 1,864 | 2,416 | 2,045 |
| Pig iron | 962 | 950 | 1,066 | 1,069 | 1,112 | 1,105 | 1,093 | 1,204 | 1,062 | 1,326 | 1,241 |
| Ferro-alloys | 5 | 6 | 7 | 8 | 8 | 7 | 8 | 8 | ... | ... | ... |
| Direct reduced iron | | | 31 | 464 | 759 | 817 | 1,051 | 1,100 | 826 | 837 | 774 |
| Total crude steel | 928 | 1,028 | 1,013 | 1,433 | 2,025 | 2,114 | 2,247 | 2,556 | 2,524 | 2,772 | 2,791 |
| (Ingots (a)) | (230) | (265) | (264) | (61) | (315) | (372) | (78) | (270) | (230) | (367) | (194) |
| STEEL PRODUCTS | | | | | | | | | | | |
| Total Steel Products | 794 | 1,257 | 1,802 | 2,043 | 2,322 | 2,009 | 2,101 | 2,284 | 2,239 | 2,316 | 2,392 |
| Total Long Products | 483 | 836 | 1,456 | 1,616 | 1,894 | 1,580 | 1,587 | 1,675 | 1,817 | 1,800 | 1,939 |
| Total Flat Products | 311 | 322 | 346 | 427 | 428 | 429 | 514 | 609 | 422 | 516 | 453 |
| HR strip | 134 | 165 | 177 | 212 | 209 | 152 | 148 | 175 | 143 | 154 | 174 |
| CR strip | 100 | 94 | 127 | 117 | 113 | 122 | 112 | 176 | 125 | 123 | ... |
| HR wide coil | ... | ... | ... | ... | ... | 51 | 73 | 56 | 65 | 136 | ... |
| HR and CR plate and shee | 66 | 42 | 24 | 77 | 66 | 68 | 166 | 178 | 73 | 90 | 147 |
| CR plate, sheet, and coil | 9 | 17 | 15 | 16 | 16 | 11 | 11 | 19 | 12 | 10 | 130 |
| Zinc coated sheet and strip | 2 | 4 | 3 | 5 | 4 | 5 | 4 | 5 | 4 | 3 | 2 |
| IMPORTS | | | | | | | | | | | |
| Pellets | | | 150 | 800 | 850 | 1,000 | 1,250 | 900 | 1,150 | 1,180 | ... |
| Pig iron | ... | 38 | 11 | 0 | ... | 30 | 144 | 204 | 97 | ... | ... |
| STEEL PRODUCTS | | | | | | | | | | | |
| Total Steel Products | 1,225 | 1,980 | 1,131 | 644 | 666 | 382 | 431 | 505 | 604 | 669 | 322 |
| Ingots and semis | 23 | 86 | 78 | 40 | 25 | 41 | 55 | 90 | 135 | 139 | 6 |
| Total Long Products | 670 | 1,400 | 740 | 393 | 267 | 71 | 96 | 86 | 208 | 217 | 54 |
| Total Flat Products | 271 | 290 | 167 | 150 | 229 | 163 | 201 | 192 | 182 | 209 | 149 |
| HR strip | 6 | 14 | 4 | 0 | 1 | 2 | 6 | 3 | 1 | 7 | 0 |
| CR strip | 5 | 8 | 4 | 3 | 5 | 2 | 3 | 3 | 3 | 6 | 3 |
| HR wide coil | 18 | 18 | 10 | 1 | 29 | 18 | 10 | 25 | 6 | 8 | 29 |
| HR and CR plate (>=3mm) | 61 | 65 | 40 | 34 | | | | | | | |
| HR plate (>=3mm) | | | | | 18 | 38 | 36 | 29 | 29 | 42 | 39 |
| HR sheet (<3mm) | 47 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 16 | 20 | 1 |
| HR plate & sheet total (1); | 108 | 65 | 40 | 35 | 19 | 38 | 38 | 29 | 45 | 62 | 40 |
| CR plate, sheet, and coil (2) | 34 | 65 | 20 | 22 | 49 | 19 | 39 | 31 | 22 | 21 | 18 |
| HR & CR plate, sheet, coil total (1+2) | 142 | 130 | 60 | 57 | 68 | 57 | 77 | 60 | 67 | 83 | 58 |
| Electrical sheet and strip | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 2 | 3 | 3 | 4 |
| Tinplate, TFS, and strip | 59 | 66 | 48 | 61 | 97 | 47 | 56 | 62 | 58 | 55 | 33 |
| Zinc coated sheet and strip | 26 | 31 | 28 | 12 | 8 | 13 | 34 | 1 | 35 | 31 | 17 |
| Other coated sheet and str | 11 | 20 | 10 | 13 | 17 | 19 | 9 | 36 | 10 | 15 | 7 |
| Total Tubes | 233 | 194 | 143 | 55 | 133 | 93 | 63 | 115 | 62 | 82 | 106 |
| EXPORTS | | | | | | | | | | | |
| STEEL PRODUCTS | | | | | | | | | | | |
| (Welded tubes) | (1) | (0) | (0) | (1) | (4) | (4) | (17) | (25) | (...) | (...) | (...) |
| Total Steel Products | 11 | 17 | 38 | 61 | 66 | 70 | 175 | 190 | 425 | 460 | 503 |
| Ref: APPARENT CONSUMPTION | | | | | | | | | | | |
| STEEL PRODUCTS | | | | | | | | | | | |
| Total Long Products | 1,153 | 2,236 | 2,196 | 2,009 | 2,161 | 1,651 | 1,683 | 1,761 | 2,025 | 2,017 | 1,993 |
| Total Flat Products | 582 | 612 | 513 | 577 | 657 | 592 | 715 | 801 | 604 | 725 | 602 |
| HR strip | 140 | 179 | 181 | 212 | 210 | 154 | 154 | 178 | 144 | 161 | 174 |
| CR strip | 105 | 102 | 131 | 120 | 118 | 124 | 115 | 179 | 128 | 129 | 3 |
| HR wide coil | 18 | 18 | 10 | 1 | 29 | 69 | 83 | 81 | 71 | 144 | 29 |
| HR and CR plate and shee | 174 | 107 | 64 | 112 | 105 | 126 | 204 | 207 | 118 | 152 | 187 |
| CR plate, sheet, and coil (2) | 43 | 82 | 35 | 38 | 65 | 30 | 50 | 50 | 34 | 31 | 148 |
| HR & CR plate, sheet, coil total (1+2) | 217 | 189 | 99 | 150 | 170 | 156 | 254 | 257 | 152 | 183 | 335 |
| Electrical sheet and strip | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 2 | 3 | 3 | 3 |
| Tinplate, TFS, and strip | 59 | 66 | 48 | 61 | 97 | 47 | 56 | 62 | 58 | 48 | 48 |
| Zinc coated sheet and strip | 28 | 35 | 31 | 17 | 12 | 18 | 38 | 6 | 39 | 34 | 19 |
| Other coated sheet and str | 11 | 20 | 10 | 13 | 17 | 19 | 9 | 36 | 10 | 15 | 7 |

Note: (a) - 1984-87 data are calculated by subtracting continuous casting and liquid steel for castings from total crude steel production.

Sources: Steel Statistics of Developing Countries 1994 and 1995 Edition, IISI

(Original: Egyptian Iron and Steel Co.; UK ISSB export statistics - data of major exporters only.)

4-2. Domestic Demand Projection

Based on the assumptions described in page S-34, the Study Team made forecast on flat steel demand in the medium term (2005 and 2006) by applying the Micro-Analysis techniques (aggregation of demand forecast for each of major consuming industries).

It is assumed that production at the proposed flat steel plant will reach the design capacity in 2005. To evaluate feasibility of the proposed plant construction, Micro-Analysis is required to determine flat steel demand by kind and dimension. Domestic demand in 2005 and 2006 obtained from Micro-Analysis for each of the three GDP growth scenarios is summarized below (see Table 4-2-2):

| Year | Lowest | Medium | Highest |
|------|---------------|---------------|---------------|
| 2005 | 1,426,846 ton | 1,733,537 ton | 1,969,969 ton |
| 2006 | 1,505,772 ton | 1,865,584 ton | 2,147,473 ton |

For long-term forecast, Macro-Analysis was conducted for the following cases:

- 1) Derived from time series analysis on steel demand between 1983 through 1993, except for 1987 and 1988 which were excluded because of anomalously high nominal figures due to the start of ANSDK's production and other factors;
- 2) Derived from the correlation between steel demand and GDP between 1984 through 1993 except for 1987 and 1988;
- 3) Derived from time series analysis on flat steel demand between 1991 through 1995;
- 4) Derived from the correlation between flat steel demand and GDP between 1991 through 1995;
- 5) Derived from the correlation between per capita GDP and steel consumption in major countries;
- 6) Derived from the correlation between per capita GDP and steel consumption in major countries which consumed 150kg per capita or less, including the following supplemental cases:
 - 6-1) Using adjusted per capita GDP for Egypt; and
 - 6-2) Adjusted per capita steel consumption for Egypt.

The results of the above estimations for flat steel demand in 2005 are summarized as follows.

THE FLAT STEEL DEMAND IN 2005

(Unit: 1,000 ton)

| | R ² | GDP growth rate | | | Time series |
|-----|----------------|-----------------|--------|---------|-------------|
| | | Lowest | Medium | Highest | |
| 1 | 0.1982 | | | | 1,021 |
| 2 | 0.0626 | 940 | 979 | 1,014 | |
| 3 | 0.3918 | | | | 1,083 |
| 4 | 0.4446 | 1,230 | 1,440 | 1,628 | |
| 5 | 0.5558 | 1,174 | 1,274 | 1,330 | |
| 6-1 | 0.5665 | 1,261 | 1,403 | 1,526 | |
| 6-2 | 0.5665 | 1,211 | 1,379 | 1,470 | |

Source: Tables 4-2-4~4-2-7, 4-2-9~4-2-11 in Main report

GDP and steel demand in Egypt have been severely affected by a number of dramatic changes including violent ups and downs of oil prices, series of political turmoil in the Middle East, and transformation from centrally planned economy to market economy. They are clearly reflected in the low degree of correlation for Cases 1 through 4. The degree of correlation for Cases 5 and 6 is higher than the degree of the others.

From the above analysis, the Case 6-1 is used for the demand forecast after 2005.

(Unit: 1,000 ton)

| | Lowest | Medium | Highest |
|------|--------|--------|---------|
| 2005 | 1,427 | 1,734 | 1,970 |
| 2010 | 1,663 | 2,086 | 2,562 |
| 2015 | 1,942 | 2,528 | 3,386 |

Source: Table 4-2-12

Demand of the flat steel in 2005 based on the Micro-Analysis, is slightly higher than that obtained by Macro-Analysis. This is probably because the latter used average GDP figures, while the former employed GDP growth rates based on construction and manufacturing sectors which grew faster than the average.

If GDP growth rates based on manufacturing sectors is used for Case 6-1, the demand in 2005 increases to 1,413,000 tons for the lowest case, 1,635,000 tons for the medium case and 1,800,000 tons for highest case which are almostly the same with the figures estimated by Micro-Analysis.

Nevertheless, there is no significant difference between the two results, which seems to verify appropriateness of the forecast based on Micro-Analysis.

Condition of Projection of Domestic Demand

- (1) GDP growth rates which were confirmed and mentioned in M/M on June 26, 1996.
 - A. The Lowest case : GDP growth rate 4%
 - B. The Medium case : GDP growth rate 5.5%
 - C. The Highest case : GDP growth 1995~2005; 6.5%
2005~2020; 8.5%
- (2) GDP growth rate of related sectors is calculated from the GDP targeted growth rate of the Third Development Plan (Table 4-2-1).

Table 4-2-1 GROWTH RATE

(Unit: % p.a.)

| | Base case | Lowest | Medium | Highest |
|---------------------------|-----------|--------|--------|---------|
| Agriculture | 3.5 | 2.8 | 3.85 | 4.55 |
| Mining & industry | 7.0 | 5.6 | 7.70 | 9.10 |
| Petroleum | 1.0 | | | |
| Electricity | 6.6 | | | |
| Construction | 7.2 | 5.76 | 7.92 | 9.36 |
| Productive service sector | 5.3 | | | |
| Social service sector | 5.7 | | | |
| Total | 5.1 | 4.0 | 5.5 | 6.5 |

Source: Calculated from Third Development plan

- (3) The ratio of the flat steel consumption to the total steel consumption of 30% is assumed as no-change due to the forecast of no-change of structure of steel consumption.
- (4) The rapid growth of consumer durable good (automobile and home appliance) is not assumed as mentioned in the M/M on June 26, 1996.
- (5) 2005 years is assumed as year of start of nominal operation in consideration of construction schedule.

Table 4-2-2 DEMAND FORECAST OF FLAT STEEL (1/4)

| | (2005) Lowest | | | | | | | | | | | | Total | | | | | |
|----------------------|------------------|--------|--------------|--------|-----------------|-------------------|----------------------|--------------------|------------|----------|--------------------|---------|--------|---------------|-------------------------|-----------|---------|-----------|
| | (1) Construction | | (2) Shipyard | | (3) Welded Pipe | (10) Gas Cylinder | (11) Metal Container | (9) Railway Boiler | (8) Boiler | (5) Auto | (4) Home Appliance | (6) Can | | (7) Furniture | (12) Other Governmental | Others | | |
| | <1,500 | >1,500 | <1,500 | >1,500 | | | | | | | | | | | | | <1,500 | >1,500 |
| t≤3mm | 5,077 | | 5,077 | 10,346 | | 10,346 | | | 862 | 0 | 20,388 | 112,241 | 86,220 | 6,898 | 86,134 | 587,505 | 0 | 587,505 |
| 3mm <t≤24mm | 227,680 | 40,266 | 267,946 | 16,209 | 45,352 | 61,561 | 172,893 | 84,427 | 9,181 | 1,785 | 34,426 | 1,133 | | 37,764 | 16,096 | 617,054 | 87,403 | 704,457 |
| t>24mm | 16,457 | 19,258 | 35,715 | | | | | 886 | 543 | | | | | 517 | 0 | 17,860 | 19,801 | 37,661 |
| Non coated Sub Total | 249,214 | 59,524 | 308,738 | 26,556 | 45,352 | 71,908 | 432,231 | 84,427 | 10,929 | 2,328 | 54,814 | 113,374 | 0 | 45,179 | 102,230 | 1,222,419 | 107,204 | 1,329,623 |
| Coated | | | | | | | | 23,279 | | | | 11,212 | 29,796 | | 32,935 | 97,223 | | 97,223 |
| Total | 249,214 | 59,524 | 308,738 | 26,556 | 45,352 | 71,908 | 432,231 | 84,427 | 10,929 | 2,328 | 54,814 | 124,587 | 29,796 | 45,179 | 135,166 | 1,319,642 | 107,204 | 1,426,846 |

| | (2005) Medium | | | | | | | | | | | | Total | | | | | |
|----------------------|------------------|--------|--------------|--------|-----------------|-------------------|----------------------|--------------------|------------|----------|--------------------|---------|---------|---------------|-------------------------|-----------|---------|-----------|
| | (1) Construction | | (2) Shipyard | | (3) Welded Pipe | (10) Gas Cylinder | (11) Metal Container | (9) Railway Boiler | (8) Boiler | (5) Auto | (4) Home Appliance | (6) Can | | (7) Furniture | (12) Other Governmental | Others | | |
| | <1,500 | >1,500 | <1,500 | >1,500 | | | | | | | | | | | | | <1,500 | >1,500 |
| t≤3mm | 6,215 | | 6,215 | 12,598 | | 12,598 | 317,447 | | 1,050 | 0 | 24,625 | 136,669 | 104,985 | 8,399 | 99,395 | 711,583 | 0 | 711,583 |
| 3mm <t≤24mm | 278,695 | 49,289 | 327,984 | 19,737 | 55,222 | 74,969 | 211,633 | 102,801 | 11,179 | 2,173 | 41,918 | 1,380 | | 45,983 | 18,574 | 752,898 | 106,684 | 859,582 |
| t>24mm | 20,144 | 23,573 | 43,717 | | | | | 1,079 | 661 | | | | | 630 | 0 | 21,353 | 24,224 | 45,577 |
| Non coated Sub Total | 305,054 | 72,862 | 377,916 | 32,335 | 55,222 | 87,557 | 529,080 | 102,801 | 13,308 | 2,895 | 66,743 | 138,049 | 0 | 55,012 | 117,970 | 1,486,334 | 130,918 | 1,617,252 |
| Coated | | | | | | | | 28,346 | | | | 13,652 | 36,231 | | 38,006 | 116,285 | | 116,285 |
| Total | 305,054 | 72,862 | 377,916 | 32,335 | 55,222 | 87,557 | 529,080 | 102,801 | 13,308 | 2,895 | 66,743 | 151,701 | 36,231 | 55,012 | 155,976 | 1,602,619 | 130,918 | 1,733,537 |

Table 4-2-2 DEMAND FORECAST OF FLAT STEEL (2/4)

| | (2005) Highest | | | | | | | | | | | | Total | | | | | |
|----------------------|------------------|--------------|-----------------|-------------------|----------------------|-------------|------------|----------|---------------------|---------|---------------|-------------------------|---------|---------|---------|-----------|---------|-----------|
| | (1) Construction | (2) Shipyard | (3) Welded Pipe | (10) Gas Cylinder | (11) Metal Container | (9) Railway | (8) Boiler | (5) Auto | (4) Home Appliances | (6) Can | (7) Furniture | (12) Other Governmental | | Others | | | | |
| t ≤ 3mm | < 1,500 | > 1,500 | Total | < 1,500 | < 1,500 | < 1,500 | > 1,500 | < 1,500 | < 1,500 | < 1,500 | < 1,500 | < 1,500 | < 1,500 | < 1,500 | > 1,500 | Total | | |
| | 7,096 | 7,096 | 14,335 | | | | 1,195 | 28,247 | 155,511 | | 119,459 | 9,557 | 109,229 | 807,068 | 0 | 807,068 | | |
| 3mm < t ≤ 24mm | 318,196 | 56,275 | 374,471 | 22,458 | 62,835 | 85,293 | 241,629 | 116,974 | 23,892 | 12,720 | 2,473 | 47,697 | 1,570 | 52,323 | 20,412 | 857,871 | 121,533 | 979,404 |
| t > 24mm | 22,999 | 26,914 | 49,913 | | | | 1,228 | 753 | | | | | | 717 | 0 | 24,944 | 27,667 | 52,611 |
| Non coated Sub Total | 348,291 | 83,189 | 431,480 | 36,793 | 62,835 | 99,628 | 604,069 | 116,974 | 23,892 | 15,143 | 3,225 | 75,945 | 157,081 | 62,596 | 129,641 | 1,639,883 | 149,249 | 1,839,132 |
| Coated | | | | | | | | | 32,254 | | | | 15,534 | | 41,283 | 41,766 | 130,837 | 130,837 |
| Total | 348,291 | 83,189 | 431,480 | 36,793 | 62,835 | 99,628 | 604,069 | 116,974 | 56,146 | 15,143 | 3,225 | 75,945 | 172,615 | 62,596 | 171,407 | 1,820,720 | 149,249 | 1,969,969 |

≤3mm SHEET DISTRIBUTION

| 2005 | HR | CR | Total |
|---------|---------|---------|---------|
| Lowest | 279,926 | 307,579 | 587,505 |
| Medium | 342,548 | 369,034 | 711,583 |
| Highest | 391,027 | 416,042 | 807,068 |

Table 4-2-2 DEMAND FORECAST OF FLAT STEEL (3/4)

| | (2006) Lowest | | | | | | | | | | | | (Unit: Ton/year) | | | | | |
|----------------------|------------------|--------|--------------|--------|-----------------|-------------------|----------------------|-------------|------------|----------|--------------------|---------|------------------|---------------|-------------------------|-----------|--------|-----------|
| | (1) Construction | | (2) Shipyard | | (3) Welded Pipe | (10) Gas Cylinder | (11) Metal Container | (9) Railway | (8) Boiler | (5) Auto | (4) Home Appliance | (6) Can | | (7) Furniture | (12) Other Governmental | Others | Total | |
| | <1,500 | >1,500 | <1,500 | >1,500 | Total | <1,500 | >1,500 | <1,500 | >1,500 | <1,500 | >1,500 | <1,500 | | >1,500 | <1,500 | >1,500 | <1,500 | >1,500 |
| t≤3mm | 5,370 | | 10,926 | | 10,926 | 274,276 | | | 910 | 0 | 21,529 | 118,527 | 91,049 | 7,234 | 89,579 | 619,450 | 0 | 619,450 |
| 3mm<t≤24mm | 240,794 | 42,586 | 283,380 | 17,117 | 47,892 | 65,009 | 89,155 | 18,210 | 9,695 | 1,885 | 36,354 | 1,196 | | 39,879 | 16,740 | 651,992 | | 744,354 |
| t>24mm | 17,405 | 20,367 | 37,772 | | | | | | 936 | 574 | | | | 546 | 0 | 18,887 | | 39,828 |
| Non coated Sub Total | 263,568 | 62,953 | 326,521 | 28,043 | 47,892 | 75,935 | 89,155 | 18,210 | 11,541 | 2,458 | 57,883 | 119,723 | 91,049 | 47,709 | 106,319 | 1,290,329 | | 1,403,631 |
| Coated | | | | | | | | 24,563 | | | 11,840 | 31,465 | | | 34,253 | 102,140 | | 102,140 |
| Total | 263,568 | 62,953 | 326,521 | 28,043 | 47,892 | 75,935 | 89,155 | 42,793 | 11,541 | 2,458 | 57,883 | 131,563 | 91,049 | 47,709 | 140,572 | 1,392,469 | | 1,505,772 |

| | (2006) Medium | | | | | | | | | | | | (Unit: Ton/year) | | | | | |
|----------------------|------------------|--------|--------------|--------|-----------------|-------------------|----------------------|-------------|------------|----------|--------------------|---------|------------------|---------------|-------------------------|-----------|--------|-----------|
| | (1) Construction | | (2) Shipyard | | (3) Welded Pipe | (10) Gas Cylinder | (11) Metal Container | (9) Railway | (8) Boiler | (5) Auto | (4) Home Appliance | (6) Can | | (7) Furniture | (12) Other Governmental | Others | Total | |
| | <1,500 | >1,500 | <1,500 | >1,500 | Total | <1,500 | >1,500 | <1,500 | >1,500 | <1,500 | >1,500 | <1,500 | | >1,500 | <1,500 | >1,500 | <1,500 | >1,500 |
| t≤3mm | 6,707 | | 13,568 | | 13,568 | 342,589 | | | 1,131 | 0 | 26,736 | 147,193 | 113,069 | 9,046 | 104,862 | 764,900 | 0 | 764,900 |
| 3mm<t≤24mm | 300,768 | 53,192 | 353,960 | 21,257 | 59,474 | 80,731 | 228,394 | 110,717 | 22,614 | 2,341 | 45,146 | 1,486 | | 49,524 | 19,596 | 811,541 | | 926,548 |
| t>24mm | 21,739 | 25,440 | 47,179 | | | | | | 1,162 | 712 | | | | 578 | 0 | 23,580 | | 49,732 |
| Non coated Sub Total | 329,214 | 78,632 | 407,847 | 34,825 | 59,474 | 94,299 | 570,983 | 110,717 | 22,614 | 3,053 | 71,882 | 148,679 | 113,069 | 59,248 | 124,458 | 1,600,021 | | 1,741,181 |
| Coated | | | | | | | | 30,529 | | | 14,703 | 39,074 | | | 40,097 | 124,403 | | 124,403 |
| Total | 329,214 | 78,632 | 407,847 | 34,825 | 59,474 | 94,299 | 570,983 | 110,717 | 53,142 | 3,053 | 71,882 | 163,382 | 113,069 | 59,248 | 164,554 | 1,724,424 | | 1,865,584 |

Table 4-2-2 DEMAND FORECAST OF FLAT STEEL (4/4)

| | (1) Construction | | (2) Shipyard | | (3) Welded Pipe | (10) Gas Cylinder | (11) Metal Container | (9) Railway | (8) Boiler | (5) Auto | (4) Home Appliance | (6) Can | (7) Furniture | (12) Other Governmental | Others | (Unit: Ton/year) | | | |
|----------------------|------------------|--------|--------------|--------|-----------------|-------------------|----------------------|-------------|------------|----------|--------------------|---------|---------------|-------------------------|---------|------------------|---------|-----------|--------|
| | <1,500 | >1,500 | <1,500 | >1,500 | | | | | | | | | | | | <1,500 | >1,500 | <1,500 | >1,500 |
| | Total | Total | Total | Total | | | | | | | | | | | | Total | Total | Total | Total |
| t ≤ 3mm | 7,760 | 7,760 | 15,640 | 15,640 | 396,365 | | | 1,303 | 0 | 30,818 | 169,663 | | 130,329 | 10,426 | 116,329 | 878,632 | 0 | 878,632 | |
| 3mm < t ≤ 24mm | 347,980 | 61,542 | 409,522 | 24,502 | 68,553 | 127,619 | 26,066 | 13,877 | 2,698 | 52,038 | 1,713 | | | 57,084 | 21,739 | 936,862 | 132,793 | 1,069,655 | |
| t > 24mm | 25,152 | 29,433 | 54,585 | | | | | 1,340 | 821 | | | | | 732 | 0 | 27,274 | 30,254 | 57,528 | |
| Non coated Sub Total | 380,891 | 90,975 | 471,866 | 40,141 | 68,553 | 127,619 | 26,066 | 16,521 | 3,519 | 82,856 | 171,375 | 0 | 130,329 | 68,293 | 138,067 | 1,842,768 | 163,047 | 2,005,815 | |
| Coated | | | | | | | 35,189 | | | | 16,948 | 45,039 | | | 44,481 | 141,657 | | 141,657 | |
| Total | 380,891 | 90,975 | 471,866 | 40,141 | 68,553 | 127,619 | 61,255 | 16,521 | 3,519 | 82,856 | 188,323 | 45,039 | 130,329 | 68,293 | 182,549 | 1,984,425 | 163,047 | 2,147,473 | |

≤3mm SHEET DISTRIBUTION

| 2006 | HR | CR | Total |
|---------|---------|---------|---------|
| Lowest | 296,025 | 323,425 | 619,450 |
| Medium | 369,637 | 395,263 | 764,900 |
| Highest | 427,571 | 451,061 | 878,632 |

Note: Calculated by the Study Team.

4-3. Future Projection of Production (Volume, Product Mix)

4-3-1. Conclusion

Based on medium-term (2005 and 2006) demand forecast by applying the Micro-Analysis, the product mix for the proposed plant was considered. This should take into account various relevant factors ranging from demand forecast for flat steel excluding oversized products not produced by the new plant, yields of product at each stage and EISCO's production assumption.

Conditions for future projection, domestic demand excluding flat steel of over size, production amount in term of slab and production demand considered EISCO's production are mentioned in 4-3-2, 4-3-3, 4-3-4 and 4-3-5 respectively.

As the conclusion, product demands in 2005 and 2006 for the proposed plants are estimated as follows.

In the case EISCO continues production shown in 4-3-2 after 2005:

(Unit: ton)

| | 2005 | | 2006 | |
|----------------|---------|-----------|---------|-----------|
| | CR | HR | CR | HR |
| Lowest growth | 181,894 | 821,493 | 205,187 | 898,509 |
| Medium growth | 272,221 | 1,120,732 | 301,284 | 1,178,309 |
| Highest growth | 341,280 | 1,351,319 | 392,702 | 1,524,358 |

In the case EISCO shuts down the plate mill (cold and hot rolling mills will continue operation):

(Unit: ton)

| | 2005 | | 2006 | |
|----------------|---------|-----------|---------|-----------|
| | CR | HR | CR | HR |
| Lowest growth | 181,894 | 902,493 | 205,187 | 979,509 |
| Medium growth | 272,221 | 1,201,732 | 301,284 | 1,259,309 |
| Highest growth | 341,280 | 1,432,319 | 392,702 | 1,605,358 |

In the event EISCO does not manufacture the products:

(Unit: ton)

| | 2005 | | 2006 | |
|----------------|---------|-----------|---------|-----------|
| | CR | HR | CR | HR |
| Lowest growth | 454,204 | 1,398,393 | 477,497 | 1,475,409 |
| Medium growth | 544,531 | 1,697,632 | 573,594 | 1,755,209 |
| Highest growth | 613,590 | 1,928,219 | 665,012 | 2,101,258 |

4-3-2. Conditions for Future Projection of Production of the New Plant

- (1) Width of roll of hot rolled and cold rolled mill is 1,500mm. Thickness of hot rolled product is less than 24mm.
- (2) Yield of product at each stage is assumed as 95%.
- (3) Supply from existing production facility

Case 1. Production based on the capacity and operation rate in 1994/95 will be continued after 2005.

| | Capacity (ton/year) | Rate | Production (ton) |
|------------|---------------------|------|------------------|
| Plate mill | 90,000 | 0.9 | 81,000 |
| Hot mill | 570,000 | 0.87 | 495,900 |
| Cold mill | 313,000 | 0.87 | 272,310 |

Case 2. The plate mill will be shut down.

Case 3. The entire plant will be shut down.

4-3-3. Domestic Demand Excluding Flat Steel of Over Size

The flat steel of width with more than 1,500mm is not produced by the new plant because the width of roll of HR and CR is estimated as 1,500mm due to the low ratio of flat steel with more than 1,500mm.

The flat steel of thickness with more than 24mm is not produced by the new plant because winding of such flat steel is difficult.

DOMESTIC DEMAND EXCLUDING FLAT STEEL OF OVER SIZE (width >1500mm, thickness >24mm)

(Unit: ton)

| 2005 | | | | | | | | | |
|--------|---------|---------|-----------|-----------|---------|-----------|-----------|---------|-----------|
| | Lowest | | | Medium | | | Highest | | |
| | HR | CR | Total | HR | CR | Total | HR | CR | Total |
| ≤ 3mm | 279,926 | 307,579 | 587,505 | 342,548 | 369,034 | 711,582 | 391,026 | 416,042 | 807,068 |
| > 3mm | 617,054 | | 617,054 | 752,898 | | 752,898 | 857,871 | | 857,871 |
| coated | | 97,223 | 97,223 | | 116,285 | 116,285 | | 130,837 | 130,837 |
| Total | 896,980 | 404,802 | 1,301,782 | 1,095,446 | 485,319 | 1,580,765 | 1,248,897 | 546,879 | 1,795,776 |

| 2006 | | | | | | | | | |
|--------|---------|---------|-----------|-----------|---------|-----------|-----------|---------|-----------|
| | Lowest | | | Medium | | | Highest | | |
| | HR | CR | Total | HR | CR | Total | HR | CR | Total |
| ≤ 3mm | 296,025 | 323,425 | 619,450 | 369,637 | 395,263 | 764,900 | 427,571 | 451,061 | 878,632 |
| > 3mm | 651,992 | | 651,992 | 811,541 | | 811,541 | 936,862 | | 936,862 |
| coated | | 102,140 | 102,140 | | 124,403 | 124,403 | | 141,657 | 141,657 |
| Total | 948,017 | 425,565 | 1,373,582 | 1,181,178 | 519,666 | 1,700,844 | 1,364,433 | 592,718 | 1,957,151 |

4-3-4. Production Amount in Term of Slab

The yield of product at each stage (from slab to HR, from HR to CR and from CR to coated steel) is estimated as 95%.

And the required production of HR includes the total demand of CR.

The total demand of CR includes the demand of coated sheet.

PRODUCTION AMOUNT IN TERM OF SLAB
(Yield of HR 0.95, of CR 0.95 x 0.95, of Coated 0.95 x 0.95 x 0.95)

| 2005 | | | | | | | | | |
|--------------|------------------|----------------|---------|------------------|----------------|---------|------------------|----------------|---------|
| | Lowest | | | Medium | | | Highest | | |
| | HR | CR | Total | HR | CR | Total | HR | CR | Total |
| ≤ 3mm | 294,659 | 340,808 | 635,467 | 360,577 | 408,902 | 769,479 | 411,606 | 460,988 | 872,595 |
| > 3mm | 649,531 | | 649,531 | 792,524 | | 792,524 | 903,022 | | 903,022 |
| coated | | 113,396 | 113,396 | | 135,629 | 135,629 | | 152,602 | 152,602 |
| Total | 1,398,393 | 454,204 | | 1,697,632 | 544,531 | | 1,928,219 | 613,590 | |

| 2006 | | | | | | | | | |
|--------------|------------------|----------------|---------|------------------|----------------|---------|------------------|----------------|---------|
| | Lowest | | | Medium | | | Highest | | |
| | HR | CR | Total | HR | CR | Total | HR | CR | Total |
| ≤ 3mm | 311,605 | 358,366 | 669,971 | 389,092 | 437,965 | 827,056 | 450,075 | 499,791 | 949,865 |
| > 3mm | 686,307 | | 686,307 | 792,524 | | 792,524 | 986,171 | | 986,171 |
| coated | | 119,131 | 119,131 | | 135,629 | 135,629 | | 165,222 | 165,222 |
| Total | 1,475,409 | 477,497 | | 1,755,209 | 573,594 | | 2,101,258 | 665,012 | |

Total CR = CR ≤ 3mm + coated Total HR = Total CR + HR ≤ 3mm + HR > 3mm

4-3-5. Production Mix of the New Plant

EISCO's production of flat steel after 2005 is effected on the required production of the new plant.

The Study Team estimated for three cases as follows.

- Case 1. Production based on the capacity and operation rate in 1994/95 will be continued.
- Case 2. The plate mill will be shut down.
- Case 3. The entire plant will be shut down.

PRODUCTION MIX OF THE NEW PLANT
(In Consideration of EISCO's Production)

| 2005 | | | | | | |
|---------|-------------------------------|---------|----------------------------------|---------|-----------------------------|---------|
| | EISCO full operation (Case 1) | | EISCO's Plate mill stop (Case 2) | | EISCO's plant stop (Case 3) | |
| | HR | CR | HR | CR | HR | CR |
| Lowest | 821,493 | 181,894 | 902,493 | 181,894 | 1,398,393 | 454,204 |
| Medium | 1,120,732 | 272,221 | 1,201,732 | 272,221 | 1,697,632 | 544,531 |
| Highest | 1,351,319 | 341,280 | 1,432,319 | 341,280 | 1,928,219 | 613,590 |

| 2006 | | | | | | |
|---------|-------------------------------|---------|----------------------------------|---------|-----------------------------|---------|
| | EISCO full operation (Case 1) | | EISCO's Plate mill stop (Case 2) | | EISCO's plant stop (Case 3) | |
| | HR | CR | HR | CR | HR | CR |
| Lowest | 898,509 | 205,187 | 979,509 | 205,187 | 1,475,409 | 477,497 |
| Medium | 1,178,309 | 301,284 | 1,259,309 | 301,284 | 1,755,209 | 573,594 |
| Highest | 1,524,358 | 392,702 | 1,605,358 | 392,702 | 2,101,258 | 665,012 |

5. EVALUATION OF NEED FOR A NEW FLAT PRODUCT PLANT CONSTRUCTION

The need for the new flat steel plant is examined from domestic demand of 2005 and 2006 and the minimum scale of production required for each process of flat steel production. The minimum scale of production for each stage of the flat steel production processes to ensure economic operation is shown below.

Note that certain portions (20% at maximum) of flat steel to be produced at the new plant are exportable, although their prices may be lower than those for the domestic market.

Pre-Conditions of Evaluation

- (1) Minimum economic scale of annual production is considered as follows.

| | |
|-------------------------------------|----------|
| Direct reduction steel making plant | 400,000t |
| Electric furnace | 200,000t |
| Continuous casting | 200,000t |
| Hot rolling | 800,000t |
| Cold rolling | 300,000t |
| Continuous annealing | 360,000t |

Critical production is hot rolling and cold rolling.

- (2) Export will be less than 20% of total production.
- (3) Product demand of new plant for each case is shown below.

PRODUCTION MIX OF THE NEW PLANT (In Consideration of EISCO's Production)

(Unit: ton)

| 2005 | | | | | | |
|---------|-------------------------------|---------|----------------------------------|---------|-----------------------------|---------|
| | EISCO full operation (Case 1) | | EISCO's Plate mill stop (Case 2) | | EISCO's plant stop (Case 3) | |
| | HR | CR | HR | CR | HR | CR |
| Lowest | 821,493 | 181,894 | 902,493 | 181,894 | 1,398,393 | 454,204 |
| Medium | 1,120,732 | 272,221 | 1,201,732 | 272,221 | 1,697,632 | 544,531 |
| Highest | 1,351,319 | 341,280 | 1,432,319 | 341,280 | 1,928,219 | 613,590 |

| 2006 | | | | | | |
|---------|-------------------------------|---------|----------------------------------|---------|-----------------------------|---------|
| | EISCO full operation (Case 1) | | EISCO's Plate mill stop (Case 2) | | EISCO's plant stop (Case 3) | |
| | HR | CR | HR | CR | HR | CR |
| Lowest | 898,509 | 205,187 | 979,509 | 205,187 | 1,475,409 | 477,497 |
| Medium | 1,178,309 | 301,284 | 1,259,309 | 301,284 | 1,755,209 | 573,594 |
| Highest | 1,524,358 | 392,702 | 1,605,358 | 392,702 | 2,101,258 | 665,012 |

Under the highest growth scenario, demand for HR and CR in 2005 will exceed the minimum economic scale.

HR demand in 2005 will exceed the minimum economic size for all the cases including the lowest growth scenario with continued production by EISCO.

Therefore, the construction of the HR mill can be justified from the demand side.

On the other hand, domestic demand for CR in 2005 under the medium growth scenario and EISCO's production to be continued after 2005 is 272,221 ton which is lower than 300,000 ton of minimum economic size but the construction of CR can be justified in consideration of export of small amount only in 2005. The domestic demand of CR increases to 301,284 ton in 2006.

Recommendation

The demand of HR and CR in 2005 meets to the economic size of plant.

2005 is the reasonable target year in consideration of the required schedule including feasibility study, government approval, basic design, tender and contract procedures, foundation work, installation of equipment, mechanical completion, start-up, and initial operation to boost the operating rate to the full capacity.

Also, it is reasonable to adopt the medium growth rate of 5.5% which is close to the average growth rate of GDP between 1983 and 1994, namely 5.7%.

After 2005, rapid growth of steel demand is expected as per capita consumption exceeds 100kg.

Therefore, the Study Team believes that construction of the flat steel mill can be justified from the demand perspectives.

In consideration to the time constraint to meet the target for full-scale operation in 2005, it is recommended to enter the second phase of feasibility study on the new flat steel plant.



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