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THE STEEL INDUSTRY OF IRAN<sup>1/</sup>

by

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## BACKGROUND

Statistics available for the last twelve years indicates as the general economic situation improved in Iran, Steel Consumption increased at a rather remarkable pace. The growth of steel consumption is therefore closely correlated to economic progress achieved during this period. The apparent domestic steel consumption (crude equivalent) rose from nearly 444 thousand tons per year in 1341 (1962-63) to 1740 thousand tons per year in 1350 (1971-72). For the whole period under study, this represents an average rate of 8.4% increase in the per capita crude steel consumption, compared with an average increase of 6.2 in the Gross National Product (See table 1).

The per capita steel consumption in Iran is currently estimated to exceed 60 kg. and this by the developing countries' standard is quite a satisfactory record.

In ten years (1962-72), during which the apparent steel consumption (crude equivalent) in Iran rose from 444 thousand tons to 1740 thousand tons, the value of imported steel (C & F Iranian Ports) shot up from 77.9 million dollars to 441.9 million dollars.

[Note : The views expressed in this paper are those of the author and do not necessarily reflect the views of the National Iranian Steel Corporation or of the Imperial Government of Iran.]

TABLE 1.1. ECONOMIC INDICATORS, 1959-72

YEAR	POPULATION OF IRAN IN MILLION	G.N.P. IN BILLION RIALS	PER CAPITA RAW STEEL CONSUMPTION IN Kg.	PER CAPITA G.N.P. IN THOUSAND RIALS
1959-60(1338)	21.7	277.6	22.5	12.8
1960-61(1339)	22.2	290.7	21.2	13.1
1961-62(1340)	22.8	304.4	15.4	14.4
1962-63(1341)	23.4	321.4	19.0	13.7
1963-64(1342)	24.0	338.9	18.9	14.1
1964-65(1343)	24.7	368.1	26.1	14.9
1965-66(1344)	25.3	402.2	34.7	15.9
1966-67(1345)	26.0	433.4	35.1	16.7
1967-68(1346)	26.7	484.2	57.1	18.1
1968-69(1347)	27.4	570.5	64.5	20.8
1969-70(1348)	28.4	621.3	58.0	21.8
1970-71(1349)	29.2	691.8	52.5	23.7
1971-72(1350)	30.1	790.7	58	26.4

Table No. 3 shows how the percentage of share of steel products which are rolled at the local rolling mill units have been rising since 1346 (1967-68). These products are mainly constructional steel, being rolled by Iran Rolling Mill Company, and welded pipes manufactured by Ahvaz Pipe Making Company, a subsidiary of NIOC (pipes of diameters 6" - 26" and 18" - 48").

As it is evident from table No. 3, the share of local rolled products is rising steadily and it is expected the share of steel product supplied by the local producers will be boosted up when Aryamehr Steel Mill Complex at Esfahan, the first fully integrated Steel Plant in Iran, reaches its initial full capacity at 600 thousand tons per year in the near future.

Table No. 3 : GROWTH OF LOCAL ROLLED STEEL PRODUCT IN IRAN DURING 1967-72 (in term of percentage to the total steel consumption)

Year	Constructional steel	Weld Pipes	Total
1346 (1967-68)	2	-	2
1347 (1968-69)	3.9	1.4	5.3
1348 (1969-70)	8.5	6.8	15.3
1349 (1970-71)	10.4	3.6	14
1350 (1971-72)	12	5.4	17.4



In order to shed more light on the question of steel consumption, it is imperative to consider the changing pattern of demand for steel in term of sectorial requirements.

Table No. 2 shows the apparent consumption of different categories of steel products during the period under study.

In the initial phase, beginning in the year 1336 (1957-58), steel is mainly used for building and construction sector, as is now a familiar feature of those countries in their early stages of development.

The table shows the percentage of constructional steel used greatly exceeds those of other products during the first four years covered by this study.

Shortly afterwards, in 1339 (1960-61), Iranian Economy suffered a temporary set-back. This state lasted only until the end of 1342 (1963-64), whereupon the economy made a spectacular recovery, and consequently a constant and gradually remarkable rate of growth was achieved. It was during this revival period that steel consumption in Iran took a phenomenal upturn. Particularly in the year 1346 (1967-68), when the newly introduced consumer durable and car-assembly industries created a substantial demand for the flat products, the present pattern of steel consumption has



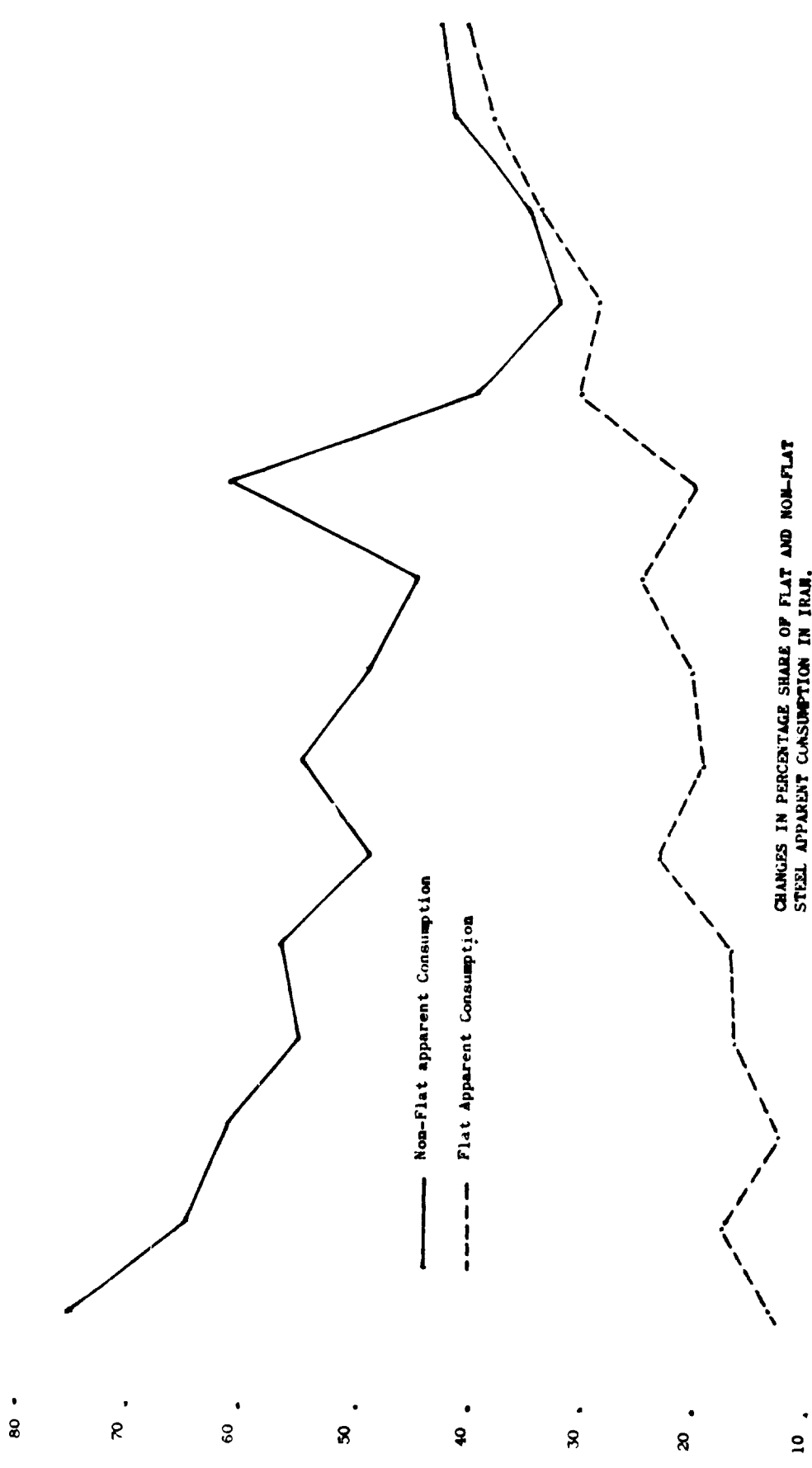
emerged. This new element in Iranian Economy in effect brought changes to both magnitude and pattern of steel demand.

Back to the non-flat steel product, it was natural the share of the market for non-flat decreased in consequence. Two factors may be identified to contribute most to the decline of non-flat consumption. Firstly, because of sudden rise in flat product consumption just mentioned and, secondly, due to slow-down of activities in the construction sector. The latter produced a decrease in the use of bars, light sections, and other constructional profiles.

However, as soon as the usual rate of activity in construction was renewed, the share of non-flat products (mainly of constructional steel) showed a definite sign of recovery, as recorded in the year 1349 (1970-71)

Rapid growth of flat products consumption as a phenomenon is almost a common-place in all countries. This is generally attributed to the production of consumer durable goods and to the fact that in the recent years heavy profiles are being replaced by strips and sheets cut length-wise and welded.

Further, in Iran, due to the increasing usage of reinforced-concrete structure, the actual rise in consumption of steel profiles was not upto expectation.



CHANGES IN PERCENTAGE SHARE OF FLAT AND NON-FLAT STEEL APPARENT CONSUMPTION IN IRAN.

Figure No. 1

1957-58 1958-59 1959-60 1960-61 1961-62 1962-63 1963-64 1964-65 1965-66 1966-67 1967-68 1968-69 1969-70 1970-71 1971-72

## STEEL PRICES

Steel Prices have been fluctuating invariably in Iran. The variations in the domestic steel price trend is illustrated in Figure No. 2.

It is noteworthy that Iranian domestic steel prices are high by world standards. In fact, from 1968 to 1972 steel prices in Iran, conditioned by the boom situation in international market, nearly doubled and eventually leveled-off at what was 85% more than the pre-boom prices. This was largely due to a rather high tariff charges on imported steel, and the exported inflationary trends of international market.

However, now that the first fully integrated steel plant in Iran (i.e. Aryamehr Steel Mill Complex) is commissioned, it is expected that steel prices in Iran are going to be less influenced by international steel market upheavals.

Actually, with Aryamehr Steel Plant production coming soon to the domestic market, it is hoped that steel prices in Iran will be lowered and the country for the first time in its history will have a chance to remain independent of the trading policies of highly industrialized countries.

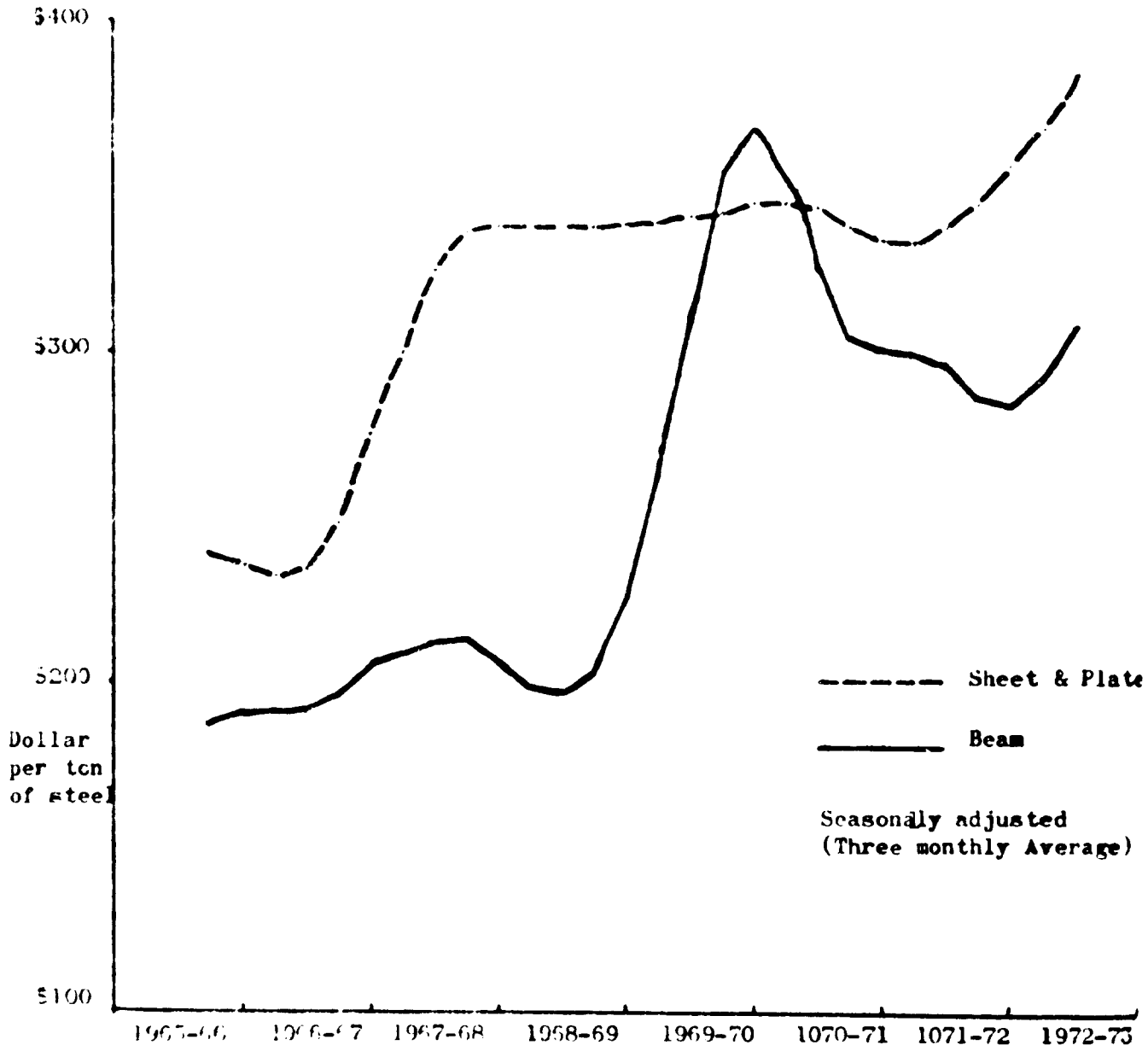


Fig. No. 3 - Trend of domestic steel prices

## RAW MATERIALS

In Iran, at the moment considerable mineral reserves are known and it is believed to be sufficient to satisfy the needs for the present installed steel-making capacity and the future expansion program. Nevertheless, explorations are carried out which will probably lead to the discovery of additional reserves.

At present National Iranian Steel Corporation, a wholly government-owned organization, is the single largest concern in Iran for exploring and operational mineral reserves needed for steel making. NISCO takes its ore from Choghart deposits at Baqgh, 540 km. from Aryamehr Steel Plant Site, located near the city of Esfahan. The magnetic ore extracted in Choghart has an average purity not less than of 60%. Total proved reserve at Choghart is estimated to be about 170 million tons. Railway spur has been constructed to transport ore to the plant site. Production of Iron Ore at Choghart practically started in 1350 (1971) and at the end of that year more than half million tons of ore had been extracted. Apart from Choghart, many other iron-ore deposits have been discovered in Baqgh Region which are going to be developed later, in order to provide necessary iron ore for the expansion of Aryamehr Steel Plant. Exploration at Baqgh and other areas are continuing to augment proven reserves of high-grade iron ore. Geological reserves of iron ore at the moment is estimated to reach 1.2 billion tons and reserves under detailed exploration is around 500 million tons.

Similarly, regarding coking-coal mines, NISCO is again extensively involved in the operation of the known coking-coal mines in Iran. Exploration for new coal bases are tirelessly been pursued in order to increase the known reserves.

NISCO operates collieries in Kerman, Alborz, Sanghrud and Shahrud regions. Kerman coal mine provides most of the required coking coal of the Aryamehr Steel Plant. Kerman coal mines are situated 700 km. south-east of the plant and the coal is delivered from Zarand by Government railway system connecting Zarand to the Steel Plant.

Ferro-alloys and refractories used in steel-making are presently being imported. It is, however, expected that with the NISCO refractory plant, scheduled to start operation shortly, the country will be self-sufficient in this respect. Other necessary raw materials needed for steel-making including limestone, dolomite, and quartzite are available in Iran and at the moment domestic requirements are being met by the local mines, most of which are located near Aryamehr Steel Plant.

## STEEL PRODUCTION

The Steel Industry in Iran is still in its preliminary stage. In fact, Iran's first fully-integrated Steel Plant, the Aryamehr Steel Complex, has just been recently inaugurated. But it is not so difficult to see that it is going to be one of the bases of the country economic growth.

For the sake of the argument, the present large-scale steel-making activities in Iran may be classified into three categories.

### 1 - ARYAMEHR STEEL PLANT

The Plant located at Riz Lanjan, 42 km. from city of Esfahan, is operated by National Iranian Steel Corporation, a wholly owned and operated state corporation.

This fully integrated steel mill, requiring an investment of more than \$400 million, will help to meet the urgent demand for capital and intermediate goods needed to maintain the rapid growth of the Iranian economy. The mill has been constructed with Soviet Union Cooperation. The Plant and main mining equipment were received in exchange for natural gas that is being supplied to USSR from southern Iran by way of 1300 km. pipeline. Oriented toward the local market, the plant has been planned in such a way as to enable it to effectively promote the expansion of a dynamic economy and to make the most efficient use of such natural resources

as iron ore and coal.

Aryamehr Steel Plant uses the BOS steel-making process and is currently capable of producing up to 700,000 tons of raw steel per year.

This amount will be raised at the first stage of expansion to 1.9 million tons and ultimately to 4 million tons. The first phase of the mill's expansion is already underway and shall be completed by 1975. By the early 1980's the Plant would enter its final phase, bringing it to 4 million tons capacity. When the Plant's initial phase of production flows on to the market, (with the existing domestic rolling capacity and a very limited amount of import) Iran will be self-sufficient in non-flat steel product, and by completing the first stage of expansion NISCO is expected to be in a position to export considerable quantity of non-flat steel to the neighbouring countries.

The Aryamehr Steel Plant comprises six main shops and 11 auxiliary services sections as follows:

Coking Plant - This unit is equipped with one coke-oven battery consisting of two blocks of coke ovens fired by coke-oven gas. It produces about 350,000 tons of coke annually for use in the blast furnace. Eventually it will also supply 100,000 tons to the local market.



Sintering Plant - equipment consist of one sintering machine covering an area of 75 square meters. Its designed capacity is 700,000 tons per year.

Blast Furnace - Useful Volume of furnace is 1.53 thousand cubic m., with an annual output of 700,000 tons of pig iron.

Converter and Rolling Mills - The converter shop is fitted with two 80 tons converters and a 1,300-ton mixer. Annual capacity of this unit is 550,000 tons of cast billets. The rolling mill shop consists of two sections, one for producing heavy steel products and the other for turning out wire rods and other light items. The Mills are designed to produce about 600,000 tons of non-flat products yearly. Production Mix of the mills at the first stage of operation consists of Beams, Sections, Merchant Bars, Semi-round bars, Wire rods, Cold-drawn wire, light rails, and strips.

Other sections includes the slag processing unit, the refractory plant, scrap yard, repair shops, and special installations to provide gas, oxygen and steam.

In order to utilize Iran's rich gas resources, a new and separate state-owned steel company was recently established to pursue the installation of steel-producing units using direct-reduction method of steel-making.

The project is, at the moment, in its study phase and final decision with regard to the technology and location shall be taken in due course.

## 2- ROLLING AND SCRAP-MELTING UNITS

Iran's first rolling mill started production in 1967 near Ahvaz, under the management of a private company called IRANIAN ROLLING MILL COMPANY. Since then, the Company has been actively increasing its rolling capacity, while steel is also being produced through smelting furnaces using available local and imported scrap. Smelting furnaces at Ahvaz are scheduled to produce initially 160,000-200,000 tons per year. Steel-making capacity, however, will be increased to 400,000 tons per year eventually.

According to available statistics, Iranian Rolling Mill Company produced nearly 200,000 tons of finished steel in 1350 (1971-72) and its present rolling and steel-making capacity is said to be around 500 thousand tons per year.

## 3- PIPE PRODUCTION

National Iranian Oil Company began making large-diameter (3" - 16" and 18" - 48") Weld Pipes in 1968. The Plant is operated by NIOC subsidiary, the Ahvaz Pipe Mill Company. The total capacity of the Plant is 250,000 tons per year. Plant initial production of straight-weld pipe have been used for the 1300 km. trans-Iranian Pipe Line that will supply Iranian natural gas to Soviet Union.

The other pipe-producing unit in Iran is operated by Ahvaz Rolling and Pipe Mills Company. The Company is formed by industrial and development Bank of Iran and a group of private industrialists. At the moment, Ahvaz Rolling and Pipe Mill Company is capable of producing 140,000 tons of hot-rolled coil and 40,000 tons of black and galvanized pipes (½" - 6" in diameter). The expansion program is, however, envisaged to increase the production to a total of 400,000 tons per year, comprising 300,000 of hot-rolled coil and 100,000 tons of black and galvanized pipes.

#### PERSONNEL AND TRAINING

As is usually the case with developing countries, Iran is in need of specialized personnel to provide its growing steel industry with required know-how and expertise.

Substantial effort has been made by the relevant Government bodies toward achieving this aim and to ensure a constant flow of skilled personnel to the domestic labour market. Training Centers are thus being established in different parts of the country and professional courses are being conducted to satisfy the need of public and private sector Steel Industry in this respect.

Along with this, National Iranian Steel Corporation, as the largest non-oil corporate employer in Iran, draws its employees from local population in Esfahan and Kerman and, by placing a great emphasis on training, bring their skill and knowledge to the required standard. So far, more than thousand young men have been sent to

Soviet Union and India to undergo technical training course as Engineers, Technicians, and Skilled Worker for the construction and operation of Aryamehr Steel Plant and Mining activities. Three training centers, two in Esfahan and one in Kerman, were established to train technically NISCO technicians and workers. In all, more than five thousand technicians and skilled workers have been trained in three training centers. Taking into account the number of skilled workers undergoing on-the-job training at the steel plant and collieries, on the whole, the country was provided with more than 15,000 technicians and skilled workers.

FUTURE PLANS

The demand for steel is expected to rise steadily during the Iran's FIFTH NATIONAL PLAN. The projection of the annual increase in steel demand for flat and non-flat steel products is estimated to be on the average 20 and 16 percent respectively during the plan. With the existing steel-producing units increasing their production capacity, the country will become self-sufficient for non-flat steel products by the end of the FIFTH PLAN, while local production of flat steel, using domestic raw material, will probably be realized in the next national plan, during the 80's.





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