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THE STEEL INDUSTRY DEVELOPMENT IN THAILAND[1/]

by

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Introduction

Accelerated economic and industrial development during the past decade has resulted in a marked increase in local consumption of iron and steel. Practically all the domestic demand was met by imports until about 1966 when local production on a limited scale began. Until now local production includes concrete reinforcing bars, wire rods, angles and strips, steel pipes, galvanized sheet, and tinplate. Such products, however, are made from imported raw materials and represent only a small part of the total market supply. The bulk of the iron and steel products required are still imported at a huge cost of foreign exchange.

The rapid growth in domestic demand for iron and steel to meet the national economic development goal, coupled with the increasing costs of imported steel, mainly due to the general world shortage, have led to a serious consideration of future plan for the development of the basic steel industry. Such basic steel industry, however, is highly complex and the economies of scale call for large investment programme requiring substantial outlay for infrastructures often beyond national capacity. Whilst small-scale manufacture of specific products is feasible in the initial stages in a developing country, there comes a time when the demand volume has increased and technological, economic, as well as political considerations influence the establishment of a large integrated operation. In this transformation process, conflicts of interests between small-scale manufacturers and large integrated mills are likely to occur without long-range forward planning. A careful examination of the techno-economic feasibility of the future expansion

programme and of the various factors involved as well as national benefits to be expected is therefore necessary for Thailand.

Domestic Steel Consumption

The growth of steel consumption in Thailand up to 1967 was relatively small and reflected a slow rate of economic development and a heavy dependence on import. The import rose from 160,000 tonnes in 1957 to about 650,000 tonnes in 1967 which, together with a small local production in the latter year of 76,000 tonnes, represents a per capita consumption of about 21 kilogrammes.

By 1968 there was a significant increase in local production to about 330,000 tonnes. Since then the consumption of steel products as represented by import plus local production rose sharply to about 900,000 tonnes by 1972. Thailand per capita consumption (Table 1) compares favorably with some countries such as Sri Lanka, India, and Indonesia; it is slightly lower than that of Brazil, Iran, Malaysia, or the Philippines but substantially lower than that of Argentina or Venezuela. Per capita consumption of developing countries, which is related to per capita income, is, of course, low compared with those of developed countries. Thailand's low per capita consumption nevertheless indicates that there is ample room for expansion of domestic demand in relation to the general economic growth.

In addition to these steel products other imports in the form of machinery, equipment, and vehicles have significant steel contents. However the steel component of such imports is difficult to measure because of the varieties of design, alloys, and special steels used. It can be expected that the volume of this material, which is substantial, will increase sharply as more primary steel products become available.

Table 1

Total Consumption and Per Capita Consumption of Steel in Selected Developing and Developed Countries 1970

	Total Consumption 1,000 tonnes	Per Capita Consumption kilogrammes
Developing Countries		
Argentina	3,286	135
Brasil	6,008	64
Sri Lanka	94	8
India	6,432	12
Indonesia	432	4
Iran	1,240	43
Malaysia	368	36
Pakistan	696	6
Philippines	1,351	35
Thailand	743	21
Venesuela	1,614	155
Developed Countries		
Australia	6,138	489
Federal Rep. of Germany	40,605	658
Japan	69,682	676
United Kingdom	25,539	458
United States	127,304	682
USSR	110,234	454

Note: Data are in terms of crude steel equivalent.

Source: United Nations, Statistical Year book 1971.

Projected Steel Consumption

Future steel consumption, which is related to economic growth, depends largely on the gross national product growth and population. Several attempts have been made in the past to estimate the future demands for steel in Thailand. Since Japan which is a major world steel producer and exporter, and has for long years dominated the Southeast Asia region, the Japanese estimate may be regarded as a reliable indicator of the potential in this area. The latest estimate of the demand in Thailand is shown in Table 2, which suggests that the demand, on product basis, would be about 1 million tonnes by 1975, 1.5 million tonnes by 1980, and 2.2 million tonnes by 1985. It will be noted that the flat products represent over 40 per cent of the total demand.

Present Steel Production Capacity

Local production of rolled bars and small sections really began over 20 years ago when a company now called the Siam Iron and Steel Co. pioneered manufacture of reinforcing bars in their early small mill. There are now 11 steel mills in operation in the country and in addition there are several secondary steel-product manufacturing facilities for wires, nails, galvanized sheets and pipes, and tinplate. Of the eleven mills, five have electric scrap-melting furnaces and all but the two major companies have re-rolling facilities. The main products include reinforcing bars, wire rods, pre-stressed concrete wire, and small sections. The estimated production capacities for 1972 are given in Table 3.

Table 2

ESTIMATED DEMAND OF STEEL PRODUCTS IN THAILAND

UNIT: METRIC TON

Year	FLAT PRODUCTS				NON-FLAT PRODUCTS				GRAND TOTAL
	Plate	HR Sheet/coil	CR Sheet/coil	TOTAL	Angle/section	Bar 6-25mm	Rod & its products	TOTAL	
1972	75,000	88,000	215,500	378,500	54,700	305,000	59,300	419,000	797,500
1973	82,500	95,800	240,600	418,900	58,500	320,000	69,900	448,400	867,300
1974	90,800	104,400	260,900	456,100	62,600	350,000	76,900	489,500	945,600
1975	99,800	113,800	274,700	488,300	67,000	385,000	84,600	536,600	1,024,900
1976	109,800	124,000	289,200	523,000	71,700	423,000	93,000	587,700	1,110,700
1977	120,800	135,100	304,700	560,600	76,700	465,000	102,400	644,100	1,204,700
1978	130,400	147,400	321,200	599,000	82,000	502,000	112,600	696,600	1,295,600
1979	140,900	160,600	338,700	640,200	87,800	542,000	123,800	753,600	1,393,800
1980	152,100	185,200	357,400	694,700	94,000	586,000	136,200	816,200	1,510,900
1981	164,300	202,100	377,300	743,700	100,500	633,000	149,800	883,300	1,627,000
1982	177,500	220,500	398,500	796,500	107,600	683,000	164,800	955,400	1,751,900
1983	191,700	240,700	421,000	853,400	115,100	738,000	181,300	1,034,400	1,887,800
1984	207,000	262,800	445,200	915,000	123,100	797,000	199,400	1,119,500	2,034,500
1985	223,600	287,000	471,000	981,600	131,800	861,000	219,400	1,212,200	2,193,800

Table 3

Production Capacities of the Steel Mills

Companies	Max. Capacity tonnes	Production tonnes		
		Electric Furnace	Re-rolling	Total
C.S. Steel Co.	140,000	3 x 20T 140,000	-	140,000
Siam Iron and Steel Co.	125,000	2 x 30T 97,000	-	97,000
Bangkok Steel Co.	70,000	1 x 20T 45,000	25,000	70,000
Bangkok Iron and Steel Co.	84,000	3 x 5T 42,000	12,000	54,000
Thai-India Co.	60,000	1 x 5T 14,000	16,000	30,000
Six other Companies	71,000	-	69,000	69,000
Total	550,000	338,000	122,000	460,000

Although the total maximum capacity has been estimated at 550,000 tonnes, the effective capacity for standard-quality products is really about 300,000 tonnes as produced by the electric steel-making furnaces. The re-rolling capacity, on the other hand, has to rely on availability of re-rolling materials at reasonable prices while supplies of billets in the world market are usually limited. The world-wide shortage of steel generally in 1973 has no doubt aggravated the difficulties and much of the manufacturing capacity is likely to be further curtailed in the future year. Under such constraints, the domestic production capacity is not anticipated to be beyond about 300,000 tonnes and Thailand would have to continue to import considerable quantities of steel products from now on.

A feature of the Thai steel industry so far follows an early pattern of some developed countries. The fact is that, of the total rolling mill capacity, only 60 per cent is based on electric steel-making, which enables control of the process to produce steels of the required standard specifications. Re-rolled products, on the other hand, have to rely on assorted raw materials, the quality of which cannot be controlled and hence the quality of the steel produced, which is dependent largely on the raw materials, does not frequently fulfill the standard requirements for many construction and engineering purposes. The prospect of meeting the demand for steel in Thailand even in small sections is therefore not so bright for several years unless new manufacturing capacities are generated. Brief description of two major rolling mills in Thailand may now be recorded.

G.S. Steel Company

This is a Thai-Japanese joint venture which started production in 1968 specializing in continuously rolled round and ribbed reinforcing bars up to 25 mm. diameter. It is situated about 27 km. in the southern suburb of Bangkok. It has three 20-tonne electric arc furnaces (7500 kVA each) and a total production capacity of 150,000 tonnes of steel

ingots per year. The steel scrap raw material includes about 25 per cent local scrap and the rest is imported, mostly from U.S.A. The ingots which are 100 x 100 x 1500 mm are reheated in an automatically discharged furnace and rolled to finished products. Some of the products also include wire rod, small sections, and small-diameter steel shafts. The company employs about 1,100 people.

Siam Iron and Steel Company

The Siam Iron and Steel Company is located about 120 km. north of Bangkok and has a modern steel rolling mill. Its current rated capacity is about 125,000 tonnes per year with two 30-tonne arc furnaces (10,000 kVA each), a 3-strand Conoast billet (100 x 100 mm) casting machine, and a Schloemann rolling mill. The steel made from local and imported scrap is quality-controlled with a Quantovac spectograph (Model 31,000).

The company also has three 20-tonne per day charcoal blast furnaces supplying its own foundry, which has also a well equipped steel casting foundry. The total work force at SISCO is about 1,400.

The world supply-demand situation, on the other hand, suggests that, with estimated total world demand of about 980 million tonnes by 1980, the production will probably run short of supply by 50-60 million tonnes. In Asia alone excluding Japan, Korea, and China, the total demand for that year is expected to be about 36 million tonnes. Thus if local production can be assumed to reach about 10 million tonnes, the shortage in this region will be of the order of 26 million tonnes, while Japan will probably have a maximum of about 30 million tonnes for export to the whole world. The shortage of steel generally and the inevitable price rise would hinder economic growth and development of domestic industries of Thailand in the developing Southeast Asia.

Expansion of The Steel Industry

Government policy

Industrial development in Thailand has up to now been in the hands of the private sector. To promote and support the industrial development, the Government has set up the Board of Investment in 1959 and the iron and steel industry is accorded a high priority in the Third National Economic and Development Plan, 1972-1976. The basic promotion priviledges provided by BOI include exemption of import duties on machineries and equipment, and a tax holiday period of 5 years from the start of production. In special cases import duty is also waived for some of the raw materials. Varying degree of protection for the promoted industry is excercised such as tax wall or, where it is considered essential, import embargo. Foreign joint ventures are welcome and generous incentives are provided particularly for export-oriented industry.

It has been recognized that expansion of the iron and steel industry requires greater incentives and co-ordinated efforts between the Government and the private sector. The latest Government attempt to promote expansion of the steel industry was shown by the BOI announcement of 9 Apr. 1973, inviting applications for setting up new flat product mills consisting of a 500,000 t.p.y. cold-roll mill, 700,000 t.p.y. hot-roll mill, and 1 million t.p.y. iron and steel-making plant, leading to a fully integrated steel complex by about 1980. To lighten the burden of the capital-intensive programme, more than one company would be permitted to operate on the different stages so long as they are situated in the same locality approved by BOI. This is to ensure that a maximum degree of integration and economic development of infrastructure can be effected. In view of the heavy commitment involved, BOI has offered an exclusive right for each of the mills as a sole producer for ten years from commencement of operation.

Although the Government policy to support the industrial development by the private sector has generally been on provision of the infrastructure facilities, in the case of the steel complex a move is being made by BOI to initiate a definite plan by the Government to provide a deep-sea harbour for bulk shipment, suitable industrial site, housing development for workers, and the utilities and land transport facilities. Unlike other countries in the Southeast Asia where the governments have taken a leading role in the planning and in the investment programme, the Thai Government so far seems to prefer remaining in the supporting role. Nevertheless this would already involve considerable Government expenditure in the infrastructure development programme.

Following the Government announcement of the invitation, four applications have been submitted by the private parties and the consideration dead-line has been set by BOI at the close of 1973. In view of the potential additional support by the Government, some of the projects applied may need certain revisions to enhance the viability of the proposals.

Expansion of the existing industry

Apart from the major expansion of the steel industry through establishment of flat products capacity referred to above, there has been some expansion plan by the existing steel mills. Up to 1972 production of the major steel mills and re-rolling mills has been confined largely to reinforcing bars. Inspite of the overall shortage of steel products in Thailand there was an apparent surplus in small round bars. To alleviate the situation the two major mills have planned diversification to other products hitherto not being produced in the country. Since then there has been shortage of steel scrap and re-rolling stock and several re-rolling mills have not been able to continue production through lack of raw materials. The drop in supply of round bars in the country has therefore delayed the diversification

programme of the major mills. Under prevailing conditions regarding world scrap supply, little expansion of the existing production can therefore be expected.

Raw Materials

Thailand has scattered reserves of some of the main raw materials for the iron and steel industry. These include iron ore, limestone, dolomite, manganese ore, fluorspar, and refractory fireclay. No coking coal has been found but substantial quantity of high-grade lignite is available which could be utilized for appropriate purposes such as for power generation, steam raising, and direct reduction of iron ore.

Iron ore

Of the total scattered reserves of over 80 million tonnes of iron ore throughout the country, the combined reserves from 5 deposits, with iron content in the range 40-50 per cent, total over 60 million tonnes. Several economic factors would have to be carefully examined before this reserve could be utilized. They could nevertheless be considered potential sources for a future exploitation plan. Initially it may be economic to import the iron ore or pellets while world iron-ore supply at reasonable international prices is available. The economics of import of iron ore and other raw materials would be greatly influenced by the Government decision to construct a deep-sea port to handle bulk sea carriers.

Fuel

It has been accepted that metallurgical coke and blast-furnace smelting of iron ore still remains the most reliable process for large-scale operation. However, limited local market for steel and limited world supply of coking coal would make blast furnace-oxygen steel-making for Thailand at a scale of about 1 million tonnes a doubtful proposition due to high initial investment cost. Alternative routes, which have in recent years gained increasing acceptance for small-scale operations, have widened the choice of fuel and

energy such as natural or oil refinery gas, naphtha, electric power, charcoal, and lignite. As more of these alternative processes become available for integrated or semi-integrated mini-mills, as has been proved in many instances, a plan for the development of the steel industry for Thailand is a matter of economic choice for a particular situation.

Evidence available today suggests that a direct-reduction process could be economic for the local size of the market. Since time is still needed to establish reliability in the use of solid reduction for sustained operation, and if opportunity costs are taken into account, direct reduction utilizing imported gas or naphtha could be considered a high probability.

Steel scrap

Steel scrap is perhaps the most important raw material for mini-mills in a developing country. World crisis regarding supply and cost of steel scrap from international sources could hardly justify it as a basis for future expansion of the steel industry in Thailand.

Factors Affecting Plans for Thailand's Basic Steel Industry

Although Thailand is essentially an agricultural country, steel is undeniably one of the most essential elements for the future development. In view of the increasing local demand while the world supply will be limited at least for the next decade, a definite plan needs to be formulated without delay if sound economic and industrial growth is to be maintained. Plans for the establishment of the basic steel industry in Thailand are subjected to several factors. Some of these major factors may be considered as follows.

1. Establishment of a basic steel industry is highly capital-intensive with low return rate, requiring long-term security for the investment. Such large scale enterprise in a developing country is beyond the capability of the private sector alone. Since the country cannot develop without steel and since steel will be in short supply in the

world market it would be logical that the Government must share some of the investment involved. The industry, on the other hand, can offer so much national benefits. Participation by the Government could be in two forms:-

a) The Government undertakes full responsibility to provide a deep harbour, an industrial site, workers' housing, utilities, and transport facilities. Investment for these could relieve the industry of about 20 percent of the total investment cost for a 1 million tonne capacity.

b) The Government could enter into joint venture with the private sector in the project investment. Such participation would have a considerable impact on the confidence of the private entrepreneur and on the security of the project regarding raw material procurement, market assurance, the raising of funds, and the protection needed.

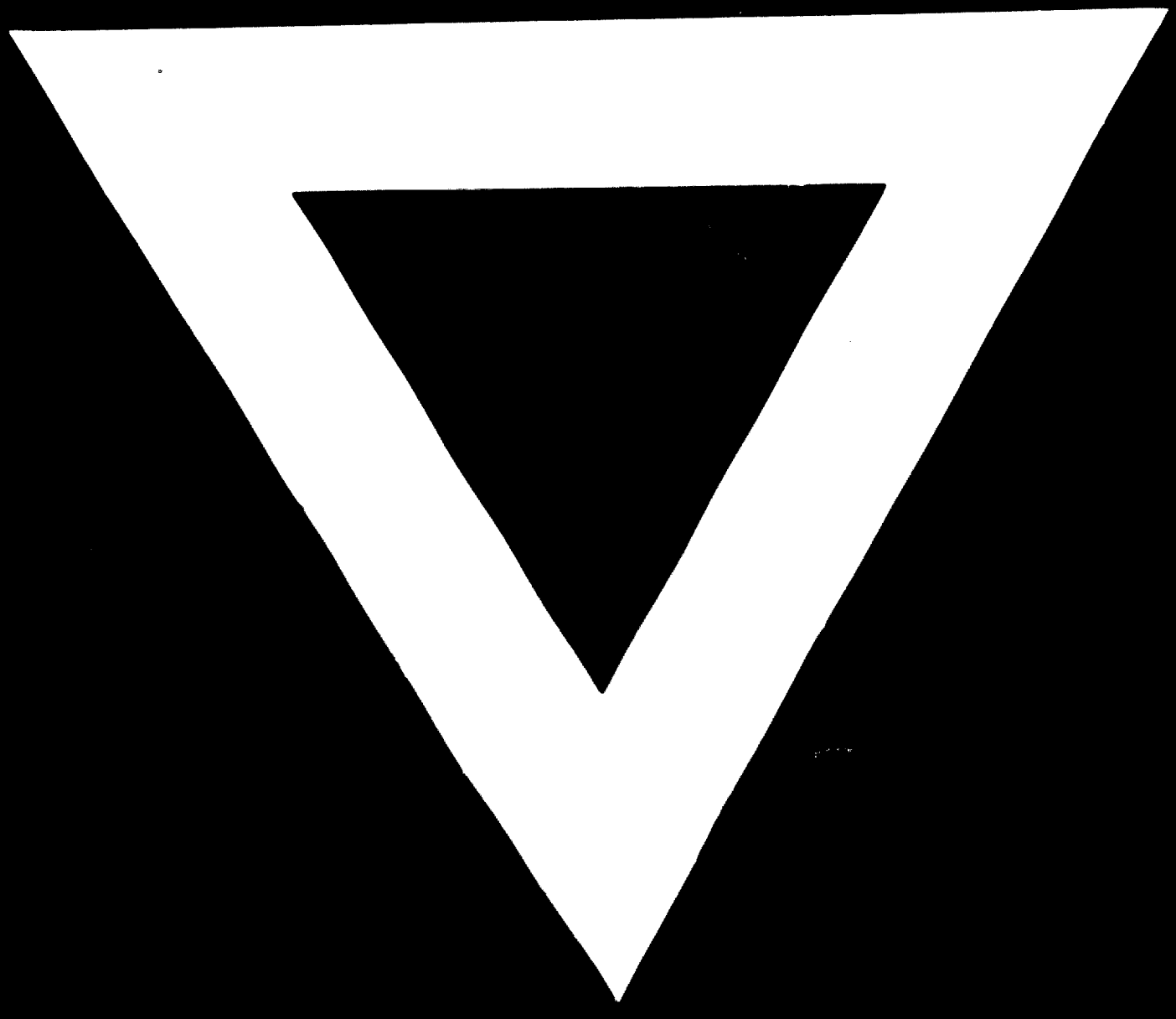
As stated earlier, the Government policy in this matter is under consideration and the indication is that a favourable view at least regarding provision of the infrastructure facilities will be taken. No doubt the necessity for Government involvement has been recognized, in view of the undesirable consequences if the industry is not developed. Whatever decision this will be, it is likely to be adopted as part of the National Economic and Development Plan continuing beyond 1980.

2. Technological development in steelmaking process today has established that blast furnace-oxygen steelmaking process and the direct reduction-electric steelmaking process are alternative and complementary routes, depending on circumstances prevailing in a particular situation. Selection of appropriate technology for Thailand requires skillful

consideration of feasibility and economics. In view of the limited capability and experience in this direction Thailand would require assistance from international sources. It hardly needs to be emphasized that a proper decision in this direction is necessary for the long-term plan.

3. Implementation of a steel project involves not only ability to operate the steelmaking plant for a particular production programme but also capability for engineering design, and research and development study necessary for the advancement and the expansion of the facilities to meet the increasing demand. Such facilities for training would not be available in the early stages of the steel development in a developing country. Assistance through bilateral or international arrangement with countries possessing long experience would be required. This matter should be part of a national policy for the steel industry development in Thailand.

4. Although the steel project could initially be set up based on imported raw materials, its viability would be enhanced if indigenious raw materials, particularly iron ore, can be utilized. Knowledge of the local resources of raw materials in Thailand is far from complete and a positive plan to appraise and to develop the available raw materials needs to be defined in the Government policy.



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