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THE INDONESIAN IRON AND STEEL INDUSTRY[1/]

by

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HISTORICAL BACK GROUND

1. The first effort to build an iron & steel industry in the country was initiated by the Government in the late 1950's, though it is known that geological surveys to find possible deposits of iron ore and coking coal were started at a much earlier date.

2. In the early 1960's the Government finally concluded a technical assistance agreement with the U.S.S.R. for the establishment of a 100,000 ton/year semi-integrated steel mill at a cost of over US$ 35 millions, primarily intended to process domestic steel scrap by smelting in open hearth furnaces then rolling to produce round bars, light sections and wire rod.

3. This plant is located near a village called "Cilegon" at the far western part of the island of Java, about 8 miles inland from a natural deep-sea harbour of Merak.
   The construction of this plant which was started in 1962 was suspended four years later, in 1965, because of deficiency in local currency, even though 85% of the equipment, worth nearly US$ 28 million, were already at the site, and 60% of the civil works had been completed.

4. Little was done except reconservation of the equipment until early 1972 when the Government formed a joint company with the Indonesian Oil Company, Pertamina, by the name of "Krakatau Steel", which then as successor of the former Cilegon Steel Project continued the construction activity at the site.

5. Now, through an extremely slow process, the Cilegon Steel Project is taking shape. Starting from its "tail", early this year, black wire has already been produced from imported wire rod at a capacity of 15,000 ton/year, and a continuous spiral welded pipe unit has also started its trial operation, producing pipe with diameter from 4" to 32" at an output of 13,000 ton/year.

6. The iron making plant, first introduced by a group of German consultants was originally planned to be built in the Lampung region, where it was supposed that hematite/magnetite iron ore could be mined economically. However this plant never came into being since it was finally determined that the iron ore deposit was not big enough to justify a blast furnace operation at an economical basis. (See table 1 on the reserve of hematite magnetite ore of Sumatra).

7. Meanwhile the Indonesian Government also signed another agreement with the U.S.S.R. in 1962 allowing Soviet experts, working in co-operation with Indonesian geologists and engineers, to carry out a comprehensive geological survey in Southern and Eastern Kalimantan (Borneo) in an effort to find basic raw materials (iron ore, coking coal and limestone) to justify the establishment of an integrated steel mill with an initial capacity of 2.8 million tons per annum.

8. This survey unfortunately ended before completion of the entire program, in late 1965.
Nevertheless the results of this investigation can be considered as a valuable information for future reference (see table-2 hematite-magnetite ores of Kalimantan).

9. Pre-war geological investigations discovered Ni-Cr bearing iron laterite in Sulawesi and Kalimantan (Table-3) and titani ferrous magnetite sand deposites on the islands of Java and Bali (table-4), with little significance to the further development of the country's iron & steel industry.

PRESENT STATUS OF THE IRON & STEEL INDUSTRY IN THE COUNTRY

10. At present there is no iron making facilities in the country. In 1971 a number of domestic private investors initiated projects to establish steel mills with capacity range from as small as 5,000 ton/year up to 25,000 ton/year.
Most of these mini-mills are scrap or billet re-rollers, producing reinforcing bars and small strips.
Some have 5 to 10-ton electric arc furnace for smelting local scrap casting into billet-size ingot.

11. Though the Government has issued license capacity of over 1,000,000 ton steel/year until the end of 1972, but the net output of 1972 is only a little over 80,000 ton and by 1974 this figure will be expected to increase up to 200,000 ton, not counting the Cilegon production of 125,.0 ton.
The overall picture of these reinforcing bar mills is shown in table -5 .

12. The secondary products of the steel industry such as. G.I. sheet, steel pipe. galvanized wire and nail wire are in their early stage of development.
Last year's domestic production of these was: G.I. sheet, 70,000 ton; steel pipe, 30,000 ton; and galvanized/black wire 15,000 ton; all figures except G.I. sheet are below the country's demand of the same year.

13. To sum up, the 1972 total national steel production only reached 200,000 ton, about 30% of the total steel consumed in the country.

THE FUTURE OF THE INDONESIAN & STEEL INDUSTRY

14. Not very much was accomplished by the end of the first eight-year Overall Development Plan (1961 - 1969).
This plan, with extremely diversified physical targets, many of them not realistic, was nothing more than a huge compilation of desires of many people. Many industrial development projects were not completed and left uncertain for many years, including the Cilegon Steel Project.

15. Then come the more realistic first five-year development plan (called "PELITA" -I") for 1969 - 1974 with strong emphasis on agricultural development and rehabilitation of infra-structure. Again the industrial sector, in particular the iron & steel industry, was put aside, with priority only given to that which directly supports the development of agriculture and rehabilitation of infra-structure. Practically no government spending was directed to the development of the country's iron & steel industry, except for survey and research.

16. Consequently private capital took over the investment to fill up the gap. Scarcity of capital in the country, together with very high interest rate(12% per annum) is reflected in the development of only small steel mills. These mills are scattered in many places, close to the centre of potential market areas, using those infra-structure facilities which already exist.

They are self supporting in the supply of power and water which increase the amount of the initial investment.

17. Without Government support in the infra-structure facilities, these small mills have to fight against hard competition of similar products imported into the country. Imported products are subject to 10% import duty and 5% import sales tax, and the ingots and rerollable scrap (basic raw material for the mills) are subject to 5% import duty and 5% import sales tax.

18. Some of these domestic mills have their own electric arc furnaces for melting local scrap. The Government banned the export of steel scrap when the supply of high quality local scrap had already became scarce, making the import of scrap in the immediate future inevitable.

19. Foreign and domestic investment laws, effective since 1967 and 1968 respectively, have been attracting investment in the steel industry. Under the provisions of these two laws, the investor may obtain some privileges, among others, tax holiday for a maximum period of 5 years, exemption from divident tax for a period not exceeding 5 years, free import duty for equipment and materials to be used for building the factory, free import duty for raw materials for two years supply, capital stamp tax on the movement of capital, etc.
Despite the high interest rate on capital from the local banks, domestic investment in the steel industry prevails.

20. From the raw materials point of view, Indonesia is less fortunate compared to its neighbouring countries such as India or Australia where high grade iron ore and coking coal are abundant. However, the size of population combined with rapid growing economy makes the future of the country's iron and steel industry promising. Late last year, in October - November, a team of Japanese experts made an elaborate survey on the iron and steel development of Indonesia. This team, in their survey report, by using three different methods, i.e. to sum up sector by sector demand forecasts, macro analysis using Gross Domestic Production (G.D.P.) and macro analysis using Gross Domestic Capital Formation (G.D.C.F.), come to a conclusion as follows:

Forecast of Apparent Steel Consumption:

Year	: Finished steel basis, : 1000 t (kg per capita)	: Converted to crude steel basis : 1000 t, (kg per capita)
1971	: 668.0 (5.6)	: 853.7 (7.1)
1974	: 933.0 (7.2)	: 1.190.8 (9.1)
1979	: 1.651.0 (11.4)	: 2.100.0 (14.5)
1984	: 2.920.0 (17.9)	: 3.730.0 (22.8)

Source: CTCA Report, January 1973

See also chart attached.

21. From the forecast made above, the annual growth rate of steel consumption, measured as a percentage and in proportion to the annual growth of the GDP, is tabulated as follows:

period	: annual growth rate of : steel consumption	: steel consumption growth : rate/growth rate of GDP
1971-'74:	11.8%	: 1.66
75- 79:	12.4%	: 1.33
80- 84:	12.1%	: 1.27

The Product mix is as follows:

	1970-72 average	1974	1979
long product	43.8%	42.0%	41.2%
flat product	34.6	35.8	38.3
Tubular product	21.6	22.2	20.5

22. From the previous surveys, investigations and studies made by experts from various countries, fully supported by Indonesian engineers and economists who have continuously tried to find a solid economic justification for the establishment of a national iron & steel industry, it could be summarized that the future development of the Indonesian iron & steel industry will depend almost entirely on the potential market in a country with 120 million people.

23. Other encouraging factors that could enhance the development of the Indonesian iron and steel industry are:
- potential low cost labour force that could easily be trained for practically all kinds of trades;
- the possibility of using natural gas as reducing agent and fuel (reformed into H_2 and CO) if the current exploration succeed in finding large enough deposits of natural gas in the vicinity of a suitable location for an iron & steel industry complex. As it is widely known, through Midland-Ross or HYLSA process, iron sponges or pellets could be economically produced from iron ore by using natural gas.

For Indonesia, the development of a national iron and steel industry has a two-fold benefit, a foreign currency saving, especially when time comes that a fully integrated mill becomes justified by the volume of market, and the employment for Indonesian labour that is entering the labour market at a vast rate every year.

24. At present, there are two definite plans for building steel mills with capacity over 200,000 ton/year.
Negotiations are now underway between Krakatau Steel and some foreign interests to build an integrated steel mill, using direct reduction method, with a planned capacity of about 500,000 ton/year (to commence operation in 1978). Other Indonesian private groups are now preparing to undertake a detailed study for a semi integrated steel mill with an initial capacity of 200,000 ton/year to be established in the eastern part of Java.

25. In the secondary steel products, Krakatau Steel together with its Japanese partner is now waiting for Government approval to built a cold reversingmill to produce cold rolled sheet with a final capacity of 325,000 ton/year by 1985, for supplying ever growing demand of steel sheet in the country. Another Japanese partner of Krakatau Steel is submitting a proposal to the Government to establish a wire rod mill at a capacity of 100,000 ton/year. Both plants will be located in the Cilegon area.

26. Furthermore the Japanese Iron & Steel Survey Mission in their report proposed in the long term the building of an integrated steel mill in the Anyer Lor region, just South of the Cilegon Steel Project, to make benefit of the proximity of Indonesia to the abundant supply of Australian iron ore and metallurgical coke. Eventually the Government decided to make the Anyer Lor region the site for the future steel industry complex from which most of the country's iron and steel products will be supplied.
This proposed integrated mill will have an initial capacity of 815,000 ton/year crude steel (1979) and at the second stage of de-

velopment the capacity will reach 2,000,000 ton/year crude steel (1984) with total intended investment of US$ 420 million including a heavy burden of infrastructure of US$ 85 million
The mill will produce billets, wire rod , hot coil and cold pig iron for foundry.

27. To encourage the development of the iron & steel industry, it is thought that the infrastructural facilities, such as power, water, road system, harbour, railway. etc. could be built with direct Government investment and, in return, the future steel industry should not have to be excessively protected against the competition of the world steel market.
Further, the interinsular and the coastal transportation system which is the back-bone of the nation's inter-island sea communication should be re-organized, in particular, to rationalize the cost element.

28. To support the manpower and research aspects for the development of iron & steel industry, an M.I.D.C. (Metals Industry Development Centre) with technical and financial support of the Belgian Government, is now nearing completion. This research and development centre is located at Bandung, West Java, the home of the oldest and the most advanced technical school the Institute of Technology Bandung (I.T.B.). The M.I.D.C. has facility for training , a well-equipped machine shop together with testing and quality control apparatus, foundry shop, laboratory, and the supporting facilities such

as office building, dormitory, etc.
In the future, the M.I.D.C. will welcome technical cooperation with more advanced industrialized nations.

CONCLUSION

29. At present there are only steel mills operate in Indonesia for supplying a very small part of the nation's need of rolled products. Pratically all of the raw materials for these mills have to be imported except a limited amount of melting scrap supplied from indigenous sources.

Indonesia has no significant amount of basic raw materials (high grade iron ore and metallurgical coke) for the establishment of iron & steel industry.
The future development of the country's iron & steel industry will depend almost entirely on the existence of a potential market for iron & steel products.
The proximity of Indonesia to the abundant supply of Australian iron ore and metalurgical coke will enhance the the future development of the national iron & steel industry.

Direct investment by the Government in infrastructural facilities for the iron & steel industry is strongly recommended in order not to exert excessive burden on initial investment which could make the cost of the iron & steel products even less competitive to the international market prices.
To rationalize the sea transportation cost, the Government is expected to re-organise the inter-insular and coastal transportation system.

Table 1

HEMATITE - MAGNETITE OF SUMATRA

deposits	reserve, metric ton			
	proved	probable	possible	total
Lampong region				
1. Pematang Durhan	260,000	280,000	150,000	690,000
2. Tanjung Senang-Penyandingan	25,000	450,000	700,000	1.175,000
3. Riau-Kirangan	15,000	-	170,000	185,000
T o t a l	300,000	730,000	1.020,000	2.050,000

Source: Department of Mines
OTCA Report

Table 2

HEMATITE - MAGNETITE ORES OF KALIMANTAN

No.	deposits	PRIMARY - ORE			
		reserve, metric ton	% Fe	% S	% P
1	2	3	4	5	6
1.	Ulin	30.000*	-	-	-
2.	Melati	-	-	-	-
3.	Tembaga	439.800**	64.43	0.26	0.08
4.		25.000*	-	-	-
5.	Batukora	35.000*	-	-	-
6.	Jajakan	1.000.000*	57.36	0.04	0.04
7.	Tanjung	27.000*	-	-	-
8.	Riampinang	500.000*	-	-	-
9.	Tanalang	2.617.700**	59.40	0.62	0.03
		335.800*	53.72	0.52	-
10.	Batuberani	-	-	-	-
total reserves:		-	*** (proved)		
		3.057.500 **	(probable)		
		1.952.800 *	(possible)		
total		5.010.300			

Deluvial-Ore: reserves, metric ton	% Fe	% S	% P	remarks
7	8	9	10	11
419.000**	51.86	0.12	0.07	reference:
70.300*	43.30	0.13	0.07	Kochergin I.A. &
67.900**	58.52	0.10	0.06	Sastrosoegito S.
40.000**	51.85	0.07	0.12	(1965)
108.300**	57.64	0.14	0.03	"Report on results of
				prospecting and ex-
				ploration surveys on
105.800***	50.99	0.03	0.09	hematite magnetite
128.700**	56.51	-	-	ores in South Easton
109.700***	52.65	0.11	0.10	part of Kalimantan
40.400*	45.06	0.07	0.12	
520.500**	60.98	0.07	0.06	
128.700**	55.77	0.07	0.04	
2.044.600**	58.43	0.07	0.05	
64.300*	51.38	0.02	0.05	
64.800**	-	-	-	
215.500*** (proved)				
3.653.700** (probable)				
344.500* (possible)				
4.213.700				

Source: Department of Mines
OTCA Report

Table 3

Ni - Cr BEARING IRON LATERITES OF SULAWESI AND KALIMANTAN

deposits	reserve, metric ton			
	proved	probable	possible	total
SULAWESI				
1. Larona	-	-	370,000,000	370,000,000
2. Lingkona	-	-	1,500,000	1,500,000
3. Lingkobale	-	-	1,500,000	1,500,000
4. Karipinan	-	-	1,000,000	1,000,000
5. Boneputih	-	-	2,000,000	2,000,000
Total			376,000,000	376,000,000
KALIMANTAN				
1. Gunung Kukusan	-	-	176,000,000	176,000,000
2. Sebuku island	6,303,000	19,817,000	-	26,120,000
3. Suwangi island	-	-	25,000	25,000
4. Danawan island	-	-	7,500,000	7,500,000
Total	6,303,000	19,817,000	183,525,000	209,645,000
Total	6,303,000	19,817,000	559,525,000	585,645,000

Notes: 1. Sulawesi : average Fe content = 49 percent

2. Kalimantan: Fe - content = 40 - 50 percent
Ni - content = 0.66 percent
Cr_2O_3 = 0.94 percent

3. Reference: - Sigit S (1969) "Minerals and Mining in Indonesia"
- Dammelen, R.W. van (1949) "The Geology of Indonesia" vol. II

source: Department of Mines
USA report

Table 4

TITANIFERROUS MAGNETITE SAND DEPOSITS OF JAVA AND BALI

locations	area (sq.km)	crude ore (metric ton)	M.D. (%)	concentrate (metric ton)	Fe-total (%)	TiO2 (%)
West Java						
1. Jampangkulon (recent)	7.57	57,952,727 **	16.00	9,352,636	54.21-58.60	12.50-13.75
2. Jampangkulon (old beach)	0.67	6,676,925 **	-	-	38.00 (crude ore)	10.00 (crude ore)
3. Sindangbarang	1.53	11,624,622 **	18.89	2,196,418	56.76	8.25
4, Cidaun	1.34	11,684,576 **	26.74	2,884,012	57.53	16.00
5. Cipatujah	1.97	9,443,390 **	21.52	2,032,217	57,89	12,04
6. Parigi-Pangandaran	2.19	7,100,626 **	2.67	190.024	-	-
Central Java						
7. Cilacap	8.47	44,646,672 ***	14.6	6,516,930	55.00	10.10
8. Purorajo	11.12	77,300,000 *	12.10	9,353,300	55.00	8.00
9. Wates	20.20	166,196,984 ***	12.30	20,442,229	55.00	8.00
10. Bantul	5.30	29.308,400 *	12.60	3,692,858	54.00	9.00
East Java						
11. Lumajang	-	23,571,900 **	11.50	3,400,768	55.00	8.00
	-	24,000,000 *	28.00	6,720,000	55.00	8.00
12.Bali	-	2,200,000 *	27.00	594,00	57.00	11.00
Total reserves		217,520,581 ***	(proved)	26,959,159		
		117,934,463 **	(probable)	18,023,858		
		142,251,790 *	(possible)	22,392,375		
total		477,706,834		67,375,392		

source: Department of Mines
OTCA Report

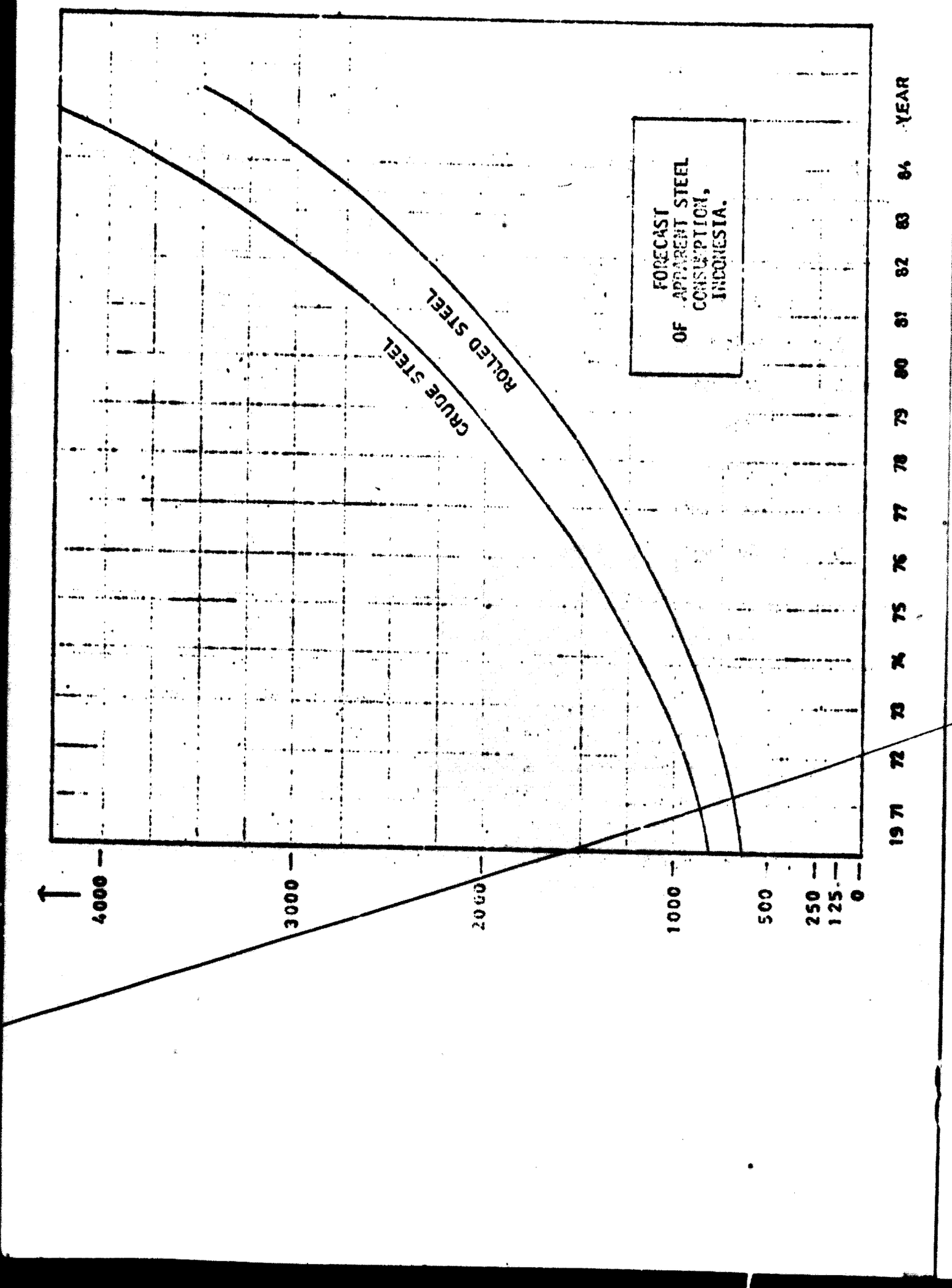
Table 5

REINFORCING BAR MILLS

No	Plant Location	No of plans	Licensed capacity ton/year*)
1	2	3	4
1.	Medan	5	95,500
2.	Palembang	1	12,000
3.	Jakarta	16	542,800
4.	Cilegon	1	270,000
5.	Cirebon	1	40,000
6.	Semarang	2	24,500
7.	Surabaya	4	54,800
	Total	30	1.043,700

Note: Source : Dept. of Industry

1. Estimate total investment US$ 100 million
2. Most of the licenses issued in 1971
3. Total production of 1972: 80.000 ton
   7.7% of the licensed capacity)
4. These plants are in various stages of construction


FORECAST
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CONSUMPTION,
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ROLLED STEEL
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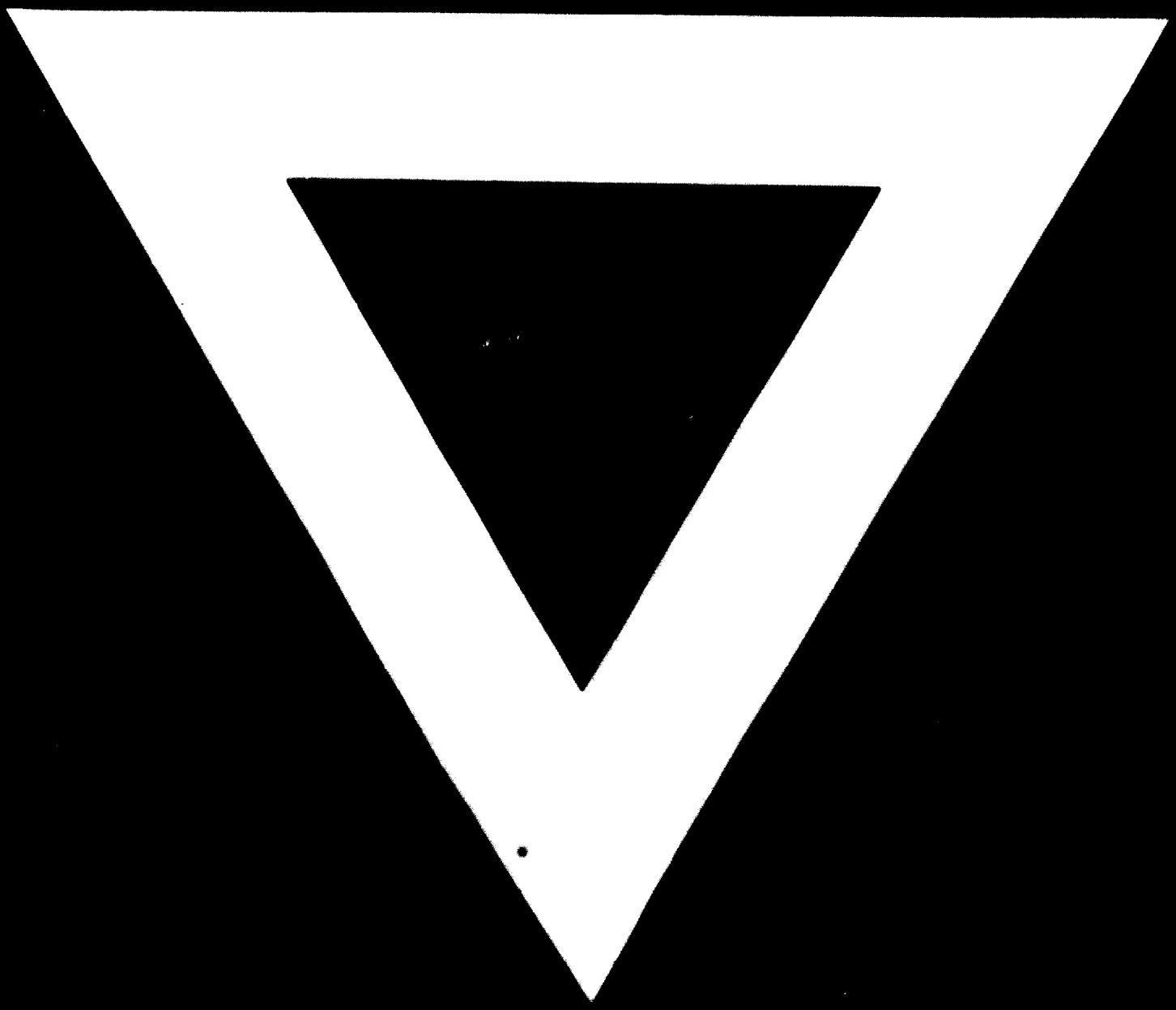
YEAR

Techno-Economic Data Sheet for
Iron and Steel Industries of Developing Countries

Name of Country	Indonesia					
	PRODUCTION (thousand metric tons)			CONSUMPTION (thousand metric tons)		
	1972 Actual	1975 Projected	1980 Projected	1972 Actual	1975 Projected	1980 *) Projected
Iron ore	-	-	-	-	-	1.000
Manganese ore	20	27	43	-	-	10
Coking coal	-	-	-	-	-	-
Non-coking coal	200	200	200	200	200	200
Pellets or sinter	-	-	773	-	-	773
Coke-oven coke	-	-	-	50	100	600
Pig iron	-	-	642	20	40	707
Crude steel	-	-	815	-	-	815
Total rolled products	80	450	1070	750	1075	1875
	Proved			Estimated		
Iron ore reserves (million metric tons)	Hematite/magnetite 515 Ni-Cr Laterite 6,303 Ti-sand 217,520			Hematite/magnetite 10,758 Ni-Cr Laterite 579,342 Ti-sand 260,186		
Coking coal reserves (million metric tons)	not available			not available		
Natural gas reserves (million metric tons)	not known			not known		

*) Consumption in 1984:

Iron ore	2,900,000 ton
Mn-ore	28,000 ton
Sintered ore	1,980,000 ton
Coke oven coke	1,100,000 ton
Pig, iron	2,000,000 ton
Crude steel	2,000,000 ton



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