OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

05271

Distr.
LIMITED

ID/WG.146/6
26 July 1973

ORIGINAL: ENGLISH

United Nations Industrial Development Organization

Third Interregional Symposium
on the Iron and Steel Industry

Brasilia, Brazil, 14 - 21 October 1973

Agenda item 8

HEAVY ENGINEERING CORPORATION - BACKBONE OF INDIA'S INDUSTRY[1/]

by

S.C. Vadera
Heavy Engineering Corporation, India

1/ The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

id.73-5235

Distr. LIMITEE
ID/WG.146/96. RESU
27 juillet 1973
FRANCAIS
Original : ANGLAIS

Organisation des Nations Unies pour le développement industriel

Troisième Colloque interrégional
sur la sidérurgie

Brasilia (Brésil), 14-21 octobre 1973

Point 8 de l'ordre du jour

RESUME

LA HEAVY ENGINEERING CORPORATION[1]

élément essentiel de l'industrie indienne

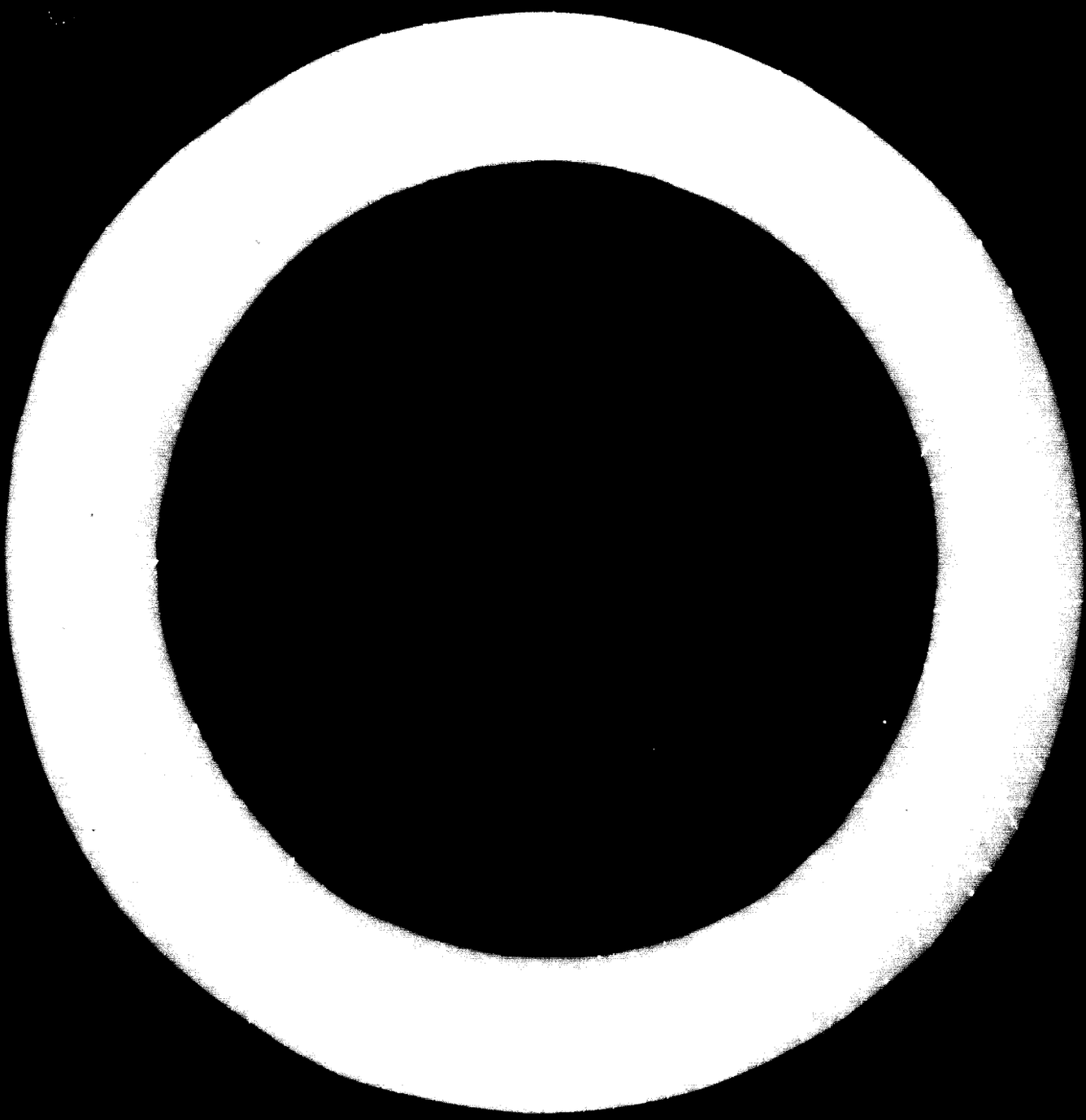
par
S. C. Vadera
Heavy Engineering Corporation
(Inde)

Cette étude décrit la création et le fonctionnement de la Heavy Engineering Corporation, la plus importante société indienne spécialisée dans la fabrication d'équipement lourd et de machines pour l'industrie métallurgique.

La Heavy Engineering Corporation comprend :

- Une usine pour la construction d'équipements lourds pour la métallurgie, d'une capacité de production annuelle de 80 000 tonnes de machines et de 25 tonnes d'éléments de structure. La mise en service de cette usine remonte à 1963;
- Des ateliers de fonderie et de forge d'une capacité annuelle d'environ 32 000 tonnes de fonte grise et de 37 000 tonnes d'acier sous forme de pièces coulées et de 26 000 tonnes de pièces forgées;
- Une usine pour la fabrication de machines-outils lourdes, qui peut produire 280 modèles différents de machines.

1/ Les opinions exprimées dans le présent document sont celles de l'auteur et ne reflètent pas nécessairement les vues du Secrétariat de l'ONUDI.



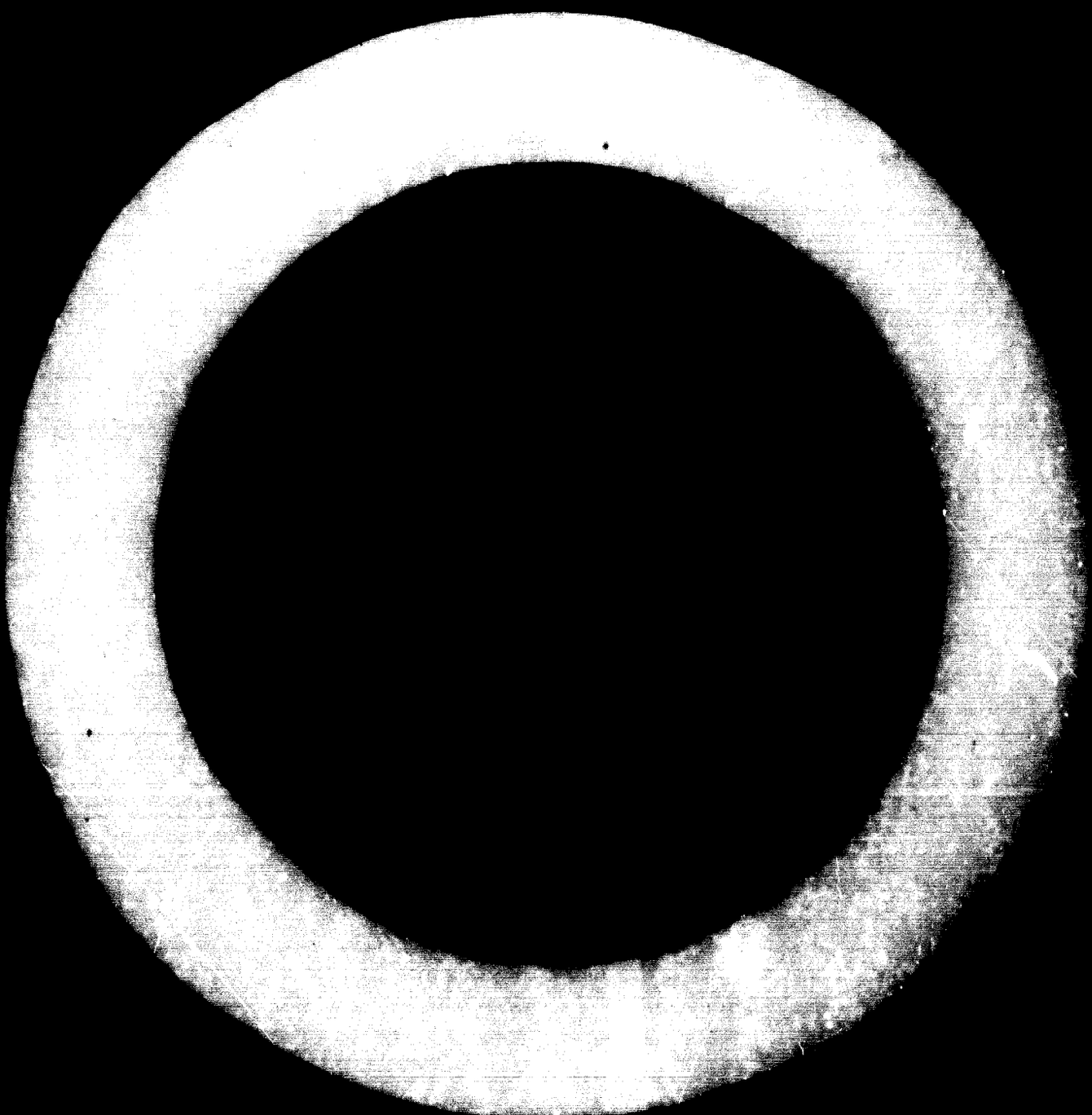
La Heavy Engineering Corporation a contribué très largement à l'équipement et à l'exploitation des usines sidérurgiques du pays, et notamment des aciéries de Bokaro et de Bhilai.

La capacité de ces installations n'est pas encore entièrement utilisée, mais devrait l'être dans un avenir proche. La société pourra alors travailler aussi pour l'exportation.

La création de la Heavy Engineering Corporation a permis à la sidérurgie indienne, à qui elle fournit des machines, des équipements et les éléments de structure qui lui sont nécessaires, de s'affranchir dans une large mesure des fournisseurs étrangers. Ultérieurement la H.E.C. produira aussi du matériel pour les industries du ciment, des engrais, des produits chimiques et, d'une manière générale, toutes les industries qui ont besoin de matériel lourd.

Cette société a été créée avec l'assistance technique de l'Union Soviétique et de la Tchécoslovaquie.

- - - - -



S U M M A R Y

The paper describes the creation and operation of the Heavy Engineering Corporation, India's largest plant for the manufacture of heavy metallurgical equipment and machines.

The Heavy Engineering Corporation is composed of :

- Heavy Machine Building Plant, with an installed capacity of 80,000 tons of heavy machinery and 25,000 tons of structurals per year. Initial production started in 1963.
- Foundry and Forge Plant, with an annual capacity of about 32,000 tons of grey-iron castings, 37,000 tons of steel castings, and about 26,000 tons of forgings.
- Heavy Machine Tools Plant, which has capacity for the manufacture of about 280 different types of heavy machine tool.

The Heavy Engineering Corporation contributed very actively to the construction and operation of the iron and steel works in the country, such as Bokaro Steel Works, the Bhilai Steel Plant, and others.

The full capacity of the plant has not yet been reached, but it is expected to attain full-capacity production in the near future. In view of this, the Heavy Engineering Corporation will have opportunities for manufacturing for clients abroad, covering a wide range of metallurgical machinery and equipment.

The creation of the Heavy Engineering Corporation ensured to a great extent the self-sufficiency of the Indian iron and steel industry in supplying it with the required machinery, equipment, and structurals. The Heavy Engineering Corporation has also been designed to supply not only the iron and steel industry but also the cement, fertiliser, chemical, and other industries with heavy equipment.

The design and the operation of the Heavy Engineering Corporation have been implemented with the technical assistance of the USSR and of the GDR.

The 300-year old temple at Ranchi dedicated to Lord Jagannath, the Hindu God, 'the protector of all', still stands on its rocky citadel in traditional splendour, a silent witness to changing times. The area around it - 40 Square Kilometers - once a jungle inhabited by the tribal Adivasis has, over the past 15 years, emerged as concrete symbol of the dedication of modern India to industrial and scientific progress.

The area has been cleared to house what is today one of the biggest heavy engineering complexes in South East Asia producing anything from a roll to rolling mill required by the country's steel plants and heavy industries. The once primitive Adivasis are today employed - nearly 5,000 of them - in the Corporation itself, producing the most modern and sophisticated equipment.

WHY THE HEAVY ENGINEERING CORPORATION

The idea of a Heavy Engineering complex was conceived in 1955 by the late Jawahar Lal Nehru. For the large-scale industrial development planned, for the various mills and factories, laying of rail and bridges, steel was the vital need of the hour. Various steel plants were being set up in the country. But it was felt that, in order to become truly self-sufficient, the heavy machinery and equipment required by the steel plants must be manufactured in India.

The idea, carefully nurtured since 1955, became a reality three years later, and in 1958, the Heavy Engineering Corporation was born in Ranchi to function as the centre of gravity of heavy metallurgical industry, feeding 'steel' giants like Rourkela and Durgapur in the East, Bokaro just 120 KM away, and Bhilai in the west, all within a radius of 800 KM. A total investment - entirely Indian - of ₹ 342 million went into it.

Besides being near the steel plants, Ranchi also had the advantage of being well connected by rail and road with the ports of Calcutta and Vishakhapatnam and having a rich hinterland. Two of the major undertakings

engaged in production of steel and coal, viz. the Hindustan Steel and the National Coal Development Corporation, are also located in Ranchi as also the Metallurgical & Engineering Consultants (India) Ltd., which undertakes projects for steel and a number of other industries.

To the planners, Ranchi offered the unique advantage of enjoying a cool temperate climate and being near the river Swarnarekha (the golden river) which has since been dammed up to provide water supply to HEC plants and township and parts of Ranchi.

HOW IT FUNCTIONS

To ensure smooth and efficient working, the Heavy Engineering Corporation (HEC) has three Engineering Plants.

Heavy Machine Building Plant: Set up with the technical collaboration of and assistance from the USSR Government, it has an installed capacity of 80,000 tonnes of heavy machinery and 25,000 tonnes of structurals per year. Initial production in the plant commenced in 1963.

A break-up of the capacity of the plant into various items of equipment is as follows:

	(in tonnes)
Coke Oven & by-product equipment	7,700
Blast Furnace equipment	5,500
Steel-making equipment	7,000
Crushing & Grinding equipment	3,150
Crane equipment	6,570
Rolling Mill equipment	34,500
Spare parts for metallurgical equipment	1,080
Mining equipment	880
Excavators	4,950
Press Forging equipment	1,360
Heavy Oil-drilling rigs	5,500
Miscellaneous heavy machine parts & assemblies	1,810
	80,000

Foundry Forge Plant: Simultaneously, it was also felt that, in order to function, the Heavy Machine Building Plant (HMBP) required heavy castings and forgings. The Foundry Forge Plant (FFP) with an annual capacity of 31,750 tonnes of grey-iron castings,

37,112 tonnes of steel castings and 20,[illegible] tonnes of forgings was set up in collaboration with M/s Technoexport (now known as Skodaexport) of Czechoslovakia. The plant mainly meets the needs of HEBP but in addition also supplies heavier ranges of castings and forgings required by a number of public and private sector units licensed for undertaking the manufacture of machinery for sugar, fertilizers, chemicals, oil, etc.

A significant addition to the plant is the 6,000 tonne forging press, the heaviest in South East Asia, which can produce 90 tonne single-piece forgings. Then there are other Presses having capacities of 1000, 1650, and 2650 tonnes.

Heavy Machine Tools Plant: - The third unit of the HEC - Heavy Machine Tools Plant (HMTP), also set up in collaboration with M/s Skodaexport - has a capacity of manufacturing 278 different types of heavy machine tools weighing 10,000 tonnes. The production range includes 13 basic types of heavy machine tools with 27 models such as radial drilling machines, horizontal boring machines, centre lathes, double column planing machines, edge-planing machines, and roll-grinding machines capable of handling all types of complicated and precision jobs.

THE ECONOMICS OF IT

Undoubtedly, there were hurdles and criticisms. In the initial years, the overlapping constructional activities along with the operational phase constituted an obvious handicap. Then the long gestation period required for any project of this magnitude slowed up the production. However, with the teething troubles over, during the last three years, the production has picked up considerably.

The following statement of the production of the three units of HEC would be an indicator:

	1969-70	1970-71	1971-72	1972-73
HTP:				
Quantity	11,695	16,021	20,954	29,414.6
Value	438.04	723.84	929.85	1,200.63
HMBP:				
Quantity	24,462	23,109	30,462	36,050.3
Value	1,418	2,052.76	2,824.63	3,599.89
HMTP:				
Quantity	542 (27 machines)	863 (28 machines)	741 (20 machines)	633.5 (22 machine
Value	82.70	113.67	126.26	131.02

Quantity in tonnes
Value in Rs. lakhs
One lakh = 0.1 million.

Production [illegible] Forge Plant during 1972-73 was higher by 40.0% than in the preceding year and production in the Heavy Machine Building Plant registered an increase of about 18.8% in the same year.

The impact of HEC on the country's economy is unquestionable. It has given a big impetus to the engineering industry and, besides equipment for steel plants, it also caters to the needs of heavy electricals, mining, petroleum, fertilizers, and shipping industries. The integrated steel plants and the industries it has helped build up triggered off a chain reaction in creating more job opportunities. By manufacturing various machines and equipment indigenously, HEC is estimated to have saved foreign exchange to the tune of nearly $ 134.2 million. It has contributed $ 65.1 million to the national exchequer so far, as interest on loans and sales tax since its inception.

HEAVY ENGINEERING CORPORATION - AT HOME

The Bokaro Steel Plant is perhaps the most talked-about in the country today. HEC can claim to be playing a major role in the establishment and expansion of this Plant.

In fact, Bokaro, which today claims that 65% of its mechanical equipment, 94% of its structurals, 48% of its electrical equipment, 80% of instrumentation, and 60% of refractories for its second-stage expansion are indigenous, owes the major share of its supplies to HEC. HEC has supplied all the equipment and structurals for the first blast-furnace complex of the plant which is being expanded to a capacity of 4 million tonnes during its second stage. HEC has nearly completed deliveries of 99,579 tonnes of equipment for the first stage of the Bokaro Steel Plant and deliveries have commenced for supplying 54,000 tonnes of equipment for its second stage. The sophisticated equipment to be supplied for the blast furnace and coke ovens of the plant includes charging apparatus, a pig-casting machine, a skip, slag-ladle cars, iron-ladle cars, auto dump cars, four-roll and two-roll crushers, a coke pusher, various types of valves, a rotary wagon tippler and, for the mechanical decanters, electrostatic precipitators and alloy cast-iron evaporators. It has also supplied a lot of equipment for the steel melting shop, hot and cold rolling mills, and auxiliary shops.

The Bokaro Steel Plant's second-stage expansion has been planned in a manner so as to achieve a capacity of 2.5 million tonnes of ingot steel on a crash programme basis by March 1974. This will involve installation of an additional coke-oven battery, fifth 100 tonne LD Converter, and an additional Oxygen Plant, besides several other auxiliary facilities. The expansion work was taken up in 1971 and since then HEC has been striving to meet the requirements of the Plant in time.

Besides Bokaro, another significant contribution of HEC has been the supply of over 13,000 tonnes of equipment and structurals for the sixth blast-furnace complex of the Bhilai Steel Plant. With this complex, the capacity of the Bhilai Steel Plant has been raised from 2.5 million tonnes to 3.2 million tonnes. The blast furnace, which was the largest till Bokaro appeared on the scene, was set up with the equipment manufactured and supplied by HEC.

HEC has also supplied equipment for the modernisation of the 28" Bar Mill at Ishapur in West Bengal and is manufacturing 4.6 cu.m. excavators, crushers, stackers, reclaimers, and loaders for various ore mines, like those at Kiriburu and Bailadilla. A 17,000 mm diameter Horton sphere is also being erected by HEC for the Fertilizer Plant at Barauni.

[illegible] Steel Plants will also be [illegible] with various equipment by HEC.

Regular manufacture of Railway machine tools has been taken up in the Heavy Machine Tools Plant which supplies axle-journal turning and burnishing lathes to the Railways. Besides, high-precision tractor gear sets and loose gears are also supplied to the Locomotive Works at Chittaranjan.

The heaviest steel roll ever cast was for IISCO Blooming Mills weighing approximately 26 tonnes with cast grooves and a diameter of 1100 mm. Various other types of rolls are also being manufactured. These include chilled rolls, alloy grain rolls, spheroidal graphite rolls, cast steel rolls, Adamite steel rolls, forged rolls, Hot Mill rolls, and Cold Mill rolls.

Besides, its 'heavier' rolls, HEC has played an important part in the development of ancillary industries in and around Ranchi. This assumes greater significance in view of the fact that the area is not so progressive and special efforts had to be made to encourage the setting up of the units by small entrepreneurs.

ANY POSSIBILITY ABROAD

With the setting up of Bokaro, HEC is now ready to venture forth into markets abroad. It can undertake any turn-key job in its line of production. It has already made a small beginning and supplied some castings to Jordan.

HEC OFFERS

To mention but a few of the complicated and sophisticated equipment the manufacture of which has been mastered and which HEC today offers:

EQUIPMENT AND TECHNOLOGICAL STRUCTURALS

1) Blast Furnace: Shells for blast furnaces made from special-grade low-alloy steel as well as stoves, dust-catchers, scrubbers, air and gas mains etc.

ii) Crushers: 100-tonne secondary and tertiary cone crushers; 250-tonne double-toggle jaw crusher and 410-tonne gyratory crusher with a capacity of 3000 tonnes of iron ore per hour.

iii) Coke Pusher: This complex machine, weighing 151.40 tonnes, is as tall as a three-storeyed building. The machine opens and closes the coke-oven doors, cleans them, pushes the hot coke from the ovens, besides performing such other functions as degraphitising the roofs of the ovens, levelling the coal charge in the oven etc.

iv) Roller Table: A number of roller tables have been manufactured for Hot and Cold Rolling Mills, some of them as heavy as 400 tonnes.

v) Coal Charging Car: Weighing 58 tonnes, the car is fitted with three 9 cum. telescopic bunkers to feed the coke ovens with coal.

vi) Charge Distributor: It receives the entire burden material of ore, coke, limestone etc., from the skip and distributes the burden uniformly over the periphery of the large bell wherefrom it is charged into the blast furnace.

vii) Wagon Tippler: It has an hourly capacity of 20 tipplings of railway wagons unloading iron ore, coal, and other raw materials in bulk at the storage yard.

viii) Ball Mill: The mill has a length of 4.7 m and an internal dia of 2.87 m. It is meant for pulverising coal and can crush 15 tonnes of coal per hour with the help of 35 tonnes of forged-steel balls in a tumbling process. It is internally lined with rows of specially designed manganese-steel casting segments.

ix) Auto Dump Car: This has a capacity of dumping 80 tonnes of iron ore, coal etc. at the stockyard.

x) Ladle Crane: The crane weighs 250 tonnes and has two independent trolleys moving on two separate tracks, the main trolley running above the auxiliary one.

CASTINGS AND FORGINGS

Some of the important castings and forgings developed are skip winch bed frame, lay-out plate, big bell, hopper, alloy grain iron grooved roll and bottom shell. In addition other castings and forgings developed are:

i) Rolls: Various types of rolls are being manufactured for rolling mills, the material varying from low-alloy steel for blooming mill to high-carbon high-chromium tool steel for tube mills.

ii) Slag Ladle: A cup-like casting, having a dia of 3.3 m. and 3.6 m. high, is a regular production item, weighing 23.2 tonnes.

iii) Drum Shaft: With a forged weight of 23 tonnes, this heavy and complicated forging is used for deep mining drum.

iv) Rolling Mill Housings: Typical example of a steel casting - it has a length of 3.5 m and weighs 31 tonnes.

v) Porter Bar: The heaviest forging made so far in India, it weighs 53 tonnes and is used as a forging aid for the operation of the 6,000-tonne Press.

vi) Bell Rod: It has a dia. of 230 mm. It weighs 5.4 tonnes and is the longest shaft so far forged. It is for manoeuvring the big bell of a blast furnace.

vii) Copper Tuyeres: Cast in dry sand moulds, with air-set sand cores and thin-walled, this intricate casting is made of pure electrolyte copper and weighs 159 kgs.

MACHINE TOOLS

Radial Drilling Machine: With capacities to drill holes of 80 mm and 100 mm diameter in steel of 60 kg/mm^2 tensile strength.

Horizontal Boring Machine: Having a spindle diameter of 100 mm (table type) and 130 mm (floor type).

Heavy-Duty Centre Lathe: Of 1000, 1250, 1600, 2000 mm swing and length ranging from 3 to 16 metres between centres, depending on customers' requirements.

Edge-Planing Machine: With planing length varying from 600 mm to 12000 mm.

Vertical Boring & Turning Mill: With table diameter of 1250 mm and 2500 mm.

Roll Grinding Machine: Having swing of 580, 1000, & 1200 mm.

Double-Column Planing Machine: With 1600 x 2000 mm Planing width.

Roll-Turning Lathe, Deep-Hole Boring Machine, Plano-Milling Machine, Railway Machine Tools, and other types of heavy machine tools are being progressively taken up for production.

IMPROVEMENTS

Meanwhile, to catch up with the latest know-how and to be at par with the best in other parts of the world, there are efforts afoot in various fields in HEC. The quality of the equipment is being constantly studied and improved upon.

QUALITY

HEC has already got a name for the rugged quality of its machines. Strict quality control is being exercised at all stages of production to ensure high quality of production. We, in India, cannot afford to replace equipment

fast enough. We, therefore, develop our designs in such a way that maintenance is relatively easier by the unit change system. This also applies to the layout and mechanism. A proper mixture of sophistication and simplicity without sacrificing efficiency has been the key-note of our designs. This feature would be of special interest to other developing nations. In fact, as the labour becomes more difficult to get in advanced countries which have to rely increasingly on low-skilled immigrant labour, HEC designs would be found to be of interest even in those countries.

COLLABORATIVE LICENSES

Soviet experts are helping to strengthen the design organisation of the Heavy Machine Building Plant which would go a long way towards achieving self-sufficiency in designing new equipment. For this purpose, HEC has entered into a contract with M/s Prommashexport of the USSR.

HEC has also entered into collaboration with a number of foreign agencies for obtaining technical know-how in various fields, principal among them being;

1. An agreement with M/s Herenschneidt of West Germany for the manufacture of a wide range of Railway machine tools.
2. Agreements with M/s National Forge of USA and M/s Creuset Loire of France for know-how for manufacture of crankshafts required by the Railways.
3. An agreement with M/s Strojimport of Czechoslovakia for the manufacture of deephole boring machines and heavy-duty centre lathes for meeting the requirements of ordnance factories.
4. A contract with M/s Licensintorg for obtaining know-how to manufacture vertical and radial type continuous-casting machines.

The ultimate aim of all these foreign collaborations is to acquire the latest know-how and ultimately develop indigenous skill and technology.

HEC DEVELOPS NEW DESIGNS

HEC attaches great importance to designs and their developments. The strength and progress of an industry hinge on newer designs. The Design Office of the Heavy Machine Building Plant is the largest single design organisation in India, engaged in the development of designs for metallurgical and other

industries in strategic sectors, incorporating latest techniques and technology. It has 17 Bureau and 330 Designers.

While HEC is proud of the people who work in it, it pays a great deal of attention to training, right from the level of artisans to the level of engineers and designers. During the last four years, our apprentices and trainees have won three gold, one silver, and 19 bronze medals in national skill competitions. Our engineers and designers have not only enriched the Corporation with their experience and knowledge, but have also gained recognition all over India. Today, there are many engineers from HEC who are working in almost all metallurgical industries and design offices in the country. Training is also available to persons from other developing countries.

The Heavy Engineering Corporation has itself done considerable work and has evolved a number of designs. These include 75 sq.m. sintering machines, sinter coolers, and crushers, 100-tonne tongs cranes, 40/50-tonne soaker cranes, 400-tonne ladle cranes, and a 1650-tonne forging press. It has

also developed working projects of pig-casting Machine, aluminium slitting and trimming lines, plate bending and plate straightening machines, automatic welding machines and 1300-tonne welded mixer.

HEC is now developing a number of other equipment such as slag ladle, iron ladle, ingot mould transfer and auto-dump cars etc. The development of sintering machine (320 sq.m.), blast furnace (2700 m^3), coke ovens (6 - 6.5 m.high), 2500-tonne hot metal mixer, and rolling mills of various types and sizes as per customer's specifications have also been taken up.

HEC is keeping close liaison with established research centres like Central Mechanical and Engineering Research Institute, Durgapur, and National Metallurgical Laboratory, Jamshedpur.

As a measure of diversifying the production range further, HEC has manufactured items like cable armouring machine, drum for mine winder, well-drilling rigs, hoisting mechanism for sluice gates, ball and socket joints, propeller shafts for ocean-going vessels and bed plates, engine frames, cylinder jackets, etc.,

for heavy-duty marine diesel engine. HEC has recently taken up the production of stackers, reclaimers and loaders for ore handling and walking drag-lines.

TRAINING FACILITIES

A regular flow of skilled and efficient workers being essential for a successful management of a giant industrial complex like HEC, a comprehensive scheme of training has been put into effect. As a part of the scheme, several hundreds of engineers have been given specialised training abroad. HEC has also set up a training institute with workshop facilities for engineers and workers who are imparted intensive training in all aspects of production engineering.

HEC TOWNSHIP

HEC, a self-sufficient township in itself, has provided accommodation to about 65% of its 20,000 employees. The township has 11,000 houses and with 14 schools and a college, has adequate facilities for the education of the children of the employees.

There is a 350-bed hospital, having the latest equipment. Another 500-bed hospital, one of the biggest in Bihar, is under construction. It is HEC's constant endeavour to provide its workers with near ideal living conditions.

during 1973-74 the percentage of utilised capacity in HEC plants was about 30%. Plants of similar nature, even in advanced countries like the USA and USSR, have taken nearly 15-20 years to reach their rated capacities and to turn over profit. A number of measures have been taken since then to achieve capacity utilisation to the maximum. The Heavy Machine Building Plant is expected to reach the break-even point in 1973-74, the Foundry Forge and the Heavy Machine Tools Plants are expected to do so in 1974-75 respectively. The production build-up envisaged for the three plants in the next few years is indicated below in tonnes:

	1973-74	1974-75	1975-76	1976-77
HMBP				
Mechanical equipment	45,000	63,300	67,300	72,000
Structurals	10,000	19,000	21,800	24,500
Total	55,000	82,300	89,100	96,500
FFP				
Saleable	45,990	57,300	70,130	83,080
HMTP				
No.of machines	40	120	160	200
Weight in tonnes	952	2,851	4,055	5,195

In short, HEC has had its teething troubles. In a developing country like India, plagued with shortages, it is trying to expand under far from ideal conditions. But it is undoubtedly emerging as one of the major set-ups which are rapidly dispelling India's image of being the land of Maharajas and snake-charmers. In fact, besides generating a chain reaction of economic development, it is seeking to contribute that which is the most vital - a sound foundation to India's industrial structure.

To sum up:

The Heavy Engineering Corporation situated at Ranchi is one of the biggest Engineering Complexes in the world, and is the backbone of India's industry.

It was established in 1958 to function as the centre of gravity of heavy metallurgical industry. It has an investment of $ 342 million.

The Corporation's three Plants - the Foundry Forge Plant, the Heavy Machine Building Plant, and the Heavy Machine Tools Plant - are turning out equipment designed to meet the needs of Steel, Cement, Fertiliser, Chemicals, Oil, Mines, and even Nuclear Research industries. They are the hallmarks of the new resurgent India and two shining examples of this are the 6th Blast Furnace of the Bhilai Steel Plant and the Ist Blast Furnace complex of the Bokaro Steel Plant built with major contribution from HEC.

The Foundry Forge Plant has set up a 6000-tonne Forging Press, the heaviest in South East Asia which can produce 90 tonne single-piece forging.

The Heavy Machine Building Plant has an installed capacity of 80,000 tonnes of heavy machinery and 25,000 tonnes of structurals per year.

The Heavy Machine Tools Plant has a capacity of manufacturing 278 different types of heavy machine tools weighing 10,000 tonnes.

The Corporation has entered into collaboration with a number of foreign agencies for obtaining technical know-how in various fields.

With the setting up of the Bokaro Steel Plant, the Corporation is now ready to venture forth into the market abroad. It can undertake any turn-key job in its line of production.

[redacted]

13.8.74