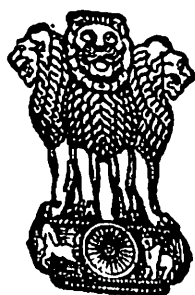


REPORT

1955—1956



सत्यमेव जयते

THE MINISTRY OF IRON & STEEL

CONTENTS

	PAGE
INTRODUCTION	I
CHAPTER I — Organizational set-up	4
CHAPTER II — Hindustan Steel Ltd.	6
CHAPTER III — Bhilai Steel Project	10
CHAPTER IV — Durgapur Steel Project	13
CHAPTER V — Nahan Foundry Ltd.	15
CHAPTER VI — Subsidiaries	18
CHAPTER VII — Recruitment and training of technical personnel	20
APPENDIX I — Memorandum of Agreement between Hindustan Steel Ltd. and Indian Gemeinschaft Krupp-Demag G.m.b.H. dated 21st July, 1955	25
APPENDIX II — The Director's Report and the audited statements of accounts of the Nahan Foundry Ltd. for the period from 1st April, 1954 to 31st March, 1955	35

CONTENTS

	PAGE
INTRODUCTION	I
CHAPTER I — Organizational set-up	4
CHAPTER II — Hindustan Steel Ltd.	6
CHAPTER III — Bhilai Steel Project	10
CHAPTER IV — Durgapur Steel Project	13
CHAPTER V — Nahan Foundry Ltd.	15
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CONTENTS

	PAGE
INTRODUCTION	I
CHAPTER I — Organizational set-up	4
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INTRODUCTION

The Ministry of Iron & Steel was created by a Presidential Order dated the 28th of May 1955 and the following subject allotted to it.

- (a) Government industrial undertakings for the production of iron and steel.
- (b) Government-owned foundries.

2. Steel is basic to industrialisation. But the production of steel within the country has always been much less than the demand. This deficiency became markedly evident during the last year of the First Plan period. Rapid development in all fields, particularly in industry, which is envisaged in the Second Five Year Plan, cannot be thought of except on the basis of steel. The key-note of the new policy was struck by the Commerce & Industry Minister, Shri T. T. Krishnamachari, when he announced early in 1954 that the target for the next Plan must be 6 million tons of ingot steel. Whatever the immediate reaction to that was, today if there is any doubt left, it is only whether this target is enough or whether events may not outdate it sooner than one imagines. This target is proposed to be attained as follows:

	Existing (in million tons)	Target for 1960 (in million tons)
I. By the expansion of existing works.		
Tata Iron & Steel Works	0.9	2.0
Indian Iron & Steel Works	0.5	0.9
Mysore Iron & Steel Works	0.03	0.1
II. By establishment of new works in the public sector.		
Rourkela Plant	..	1.0
Bhilai Plant	..	1.0
Durgapur Plant	..	1.0
TOTAL	1.43	6.0

The decision to constitute a separate Ministry to deal exclusively with the establishment of new works in the public sector underlines the determination of the Government to achieve this target.

3. The Ministry of Iron & Steel which came into being on the 15th of June 1955 took over from the Ministry of Production the responsibility for the planning and execution of the two Steel Works at Rourkela and Bhilai and also the administration of the Nahan Foundry Limited, Nahan (Himachal Pradesh). The planning and execution of the third steel plant which was to be located either in West Bengal or in Bihar was taken over from the Ministry of Commerce & Industry.

4. Considerable progress has been made with the planning and construction of the Steel Works at Rourkela. The site has been got ready and the township is under construction. Tenders have been received for two main sections of the plant, viz., for the coke ovens and the blast furnaces. Negotiations are going on for the best method of speedy construction of the other sections of the plant. Work has begun in Bhilai for the preparation of the site, the building of the township and other preliminary works. A team of Russian experts led by the Deputy Minister for Iron & Steel in the USSR, Mr. Khlebnicov, presented the Final Project Report to the Government of India on the 9th December 1955. This Report has been examined by the Government of India with the assistance of Indian experts and the Consulting Engineers of the Government of India. As a result, certain modifications have been agreed upon and a contract has been concluded for the supply of equipment and the erection of the Steel Works according to the Project Report as modified. Certain sections of the plant are expected to go into operation in 1958 and the Steel Works as a whole by December 1959.

5. The United Kingdom Steel Mission which came out under the Colombo Plan to survey and report on the establishment of a third Government steel plant submitted its report in August 1955. The Mission recommended Durgapur in West Bengal as the site for the location of this plant. The recommendations of the United Kingdom Steel Mission were generally accepted by the Government of India. To advise the Government of India on technical matters connected with all steel questions and in particular with the construction of the third Steel Plant at Durgapur, a well known firm of Consulting Engineers—The International Construction Company Ltd., London—was appointed as the Consulting Engineers to the Government of India. At the same time, with a view to explore the possibility of the speedy construction of the plant, a delegation from a British Consortium of steel manufacturers was invited and discussions were held to find out whether there could be a satisfactory arrangement for the construction of the complete Steel Works by one agency. The British Consortium—The Indian Steel works Construction Co. Ltd.—submitted its preliminary quotations

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and specifications in the middle of January, 1956. These were examined by the Government of India with the assistance of the Consulting Engineers and further discussed with a delegation from the British Consortium. An agreement has been reached on the broad structure of the contract to be entered into with the Consortium. The detailed specifications and the final quotations will be submitted by the Consortium by the middle of May. If the final Contract is concluded by the end of June 1956, it is expected that certain sections of the plant will go into operation in the middle of 1959 and the entire Steel Works by December, 1960.

CHAPTER I

ORGANISATIONAL SET-UP

The Ministry which was formed on the 15th of June 1955, consists, at present, of one Secretary, two Deputy Secretaries and two Under Secretaries. The office itself is divided into ten sections each of which has one Section Officer.

The Ministry is assisted in civil engineering matters by a Civil Engineering Adviser who has a number of junior officers working under him. On all general steel questions, plant lay-out and engineering, it is assisted by a reputed firm of Consulting Engineers, viz., the International Construction Co., London. A certain number of technical representatives of the consultant firm will be stationed in Delhi, to be available to the Ministry for advice from day-to-day.

The management of the Steel Works at Rourkela is under a Company—Hindustan Steel Ltd.—which has an authorised capital of Rs. 100 crores and an issued and paid-up capital of Rs. 5 lakhs. The share capital of this company is to be subscribed by the Government of India and the German Combine—Indiengemeinschaft Krupp-Demag G.m.b.H.—in the proportion of four to one. The Board of Directors consists of eight directors nominated by the Government of India and two directors by the German Combine. The day-to-day administration of the company is carried on by the Managing Director who is assisted by a Financial Adviser and a Technical Adviser.

The construction of the Steel Works at Bhilai has been entrusted to a Project Division with a General Manager at the head of it. The General Manager is assisted by a Financial Adviser on financial and accounting matters and a Soviet Chief Engineer on technical matters.

The construction of the Steel Works at Durgapur will be, if the present negotiations with the Indian Steelworks Construction Co. Ltd. are successful, entrusted to that company. At the same time there will be appointed a General Manager and the responsibility of the Government of India with regard to local administrative matters and the supervision of the work is proposed to be discharged through a General Manager who will have available to him the advice and assistance of the Consulting Engineers on all technical

matters. To carry out the acquisition of land, clearance of the site and similar preliminary work on the site, a field office has been established at Durgapur with a Project Administrator at the head of it.

The Foundry at Nahan which was taken over from the Sirmur Darbar is owned by the Government of India entirely. The management of the Foundry has been entrusted to a company—Nahan Foundry Ltd. The Board of Directors consists of four nominees of the Government of India and four nominees of the Government of Himachal Pradesh with the Chairman appointed by the Government of India. The day-to-day administration of the Foundry is entrusted to a General Manager. Under the Presidential Order dated the 21st February, 1956, the subject of foundries has been transferred to the Ministry of Commerce & Industry.

CHAPTER II

HINDUSTAN STEEL LIMITED

The first result of the Government's efforts to enter into suitable arrangement with steel makers of established reputation for financial and technical association in the establishment of steel plants in the public sector was an agreement between the Government of India and the German Combine of Krupps and Demag in 1953. Following the agreement with this German firm, the Hindustan Steel Ltd. was promoted with an authorised capital of Rs. 100 crores and an issued and paid up capital of Rs. 5 lakhs, of which Rs. 4 lakhs were contributed by the Government of India and Rs. 1 lakh by the German Combine. In May 1954 the German Combine submitted a preliminary Project Report for a plant of $\frac{1}{2}$ million tons ingots capacity. After this was approved, the Technical Consultants submitted the Final Project Report in January, 1955. Meanwhile, it was decided to increase the capacity of the plant from $\frac{1}{2}$ million tons to 1 million tons steel ingots per annum, with the result that a Supplementary Agreement was signed between Hindustan Steel Ltd. and Messrs. Indian Gemeinschaft Krupp-Demag G.m.b.H. on the 21st July, 1955. A copy of this Agreement is at Appendix I.

2. In terms of this agreement, the German Combine submitted the first part of the Final Project Report for the 1-million-ton plant in November, 1955. This Report has been scrutinized by the Government with the help of experts and approved with certain modifications. The main sections of the plant, as approved, are:

- (a) A coking plant with a capacity of about 1.6 million tons of coal "through-put" per annum;
- (b) A blast furnace plant consisting of 3 furnaces to start with (to be increased to 4 furnaces later on) with noted output of 1,000 tons per furnace per day;
- (c) A steel melting shop employing mainly the oxygen blowing process (L-D process); and
- (d) A large rolling mill plant of modern design for hot and cold rolling, including a broad strip mill for strips upto 1.525mm in width.

The plant will manufacture 720,000 tons of flat products from one million tons of ingot steel per annum. The manufacturing programme comprises heavy plate for ship-building, locomotive construction, boiler making, track building, etc. and light plate and strip, hot and cold rolled, tinned and galvanized.

3. An outstanding feature of the Rourkela plant will be the adoption of Linz-Donawitz (L.D) oxygen blowing process which was developed in Austria in recent years and is employed in about eight Steel Works in the world, four of them being on the North American Continent. This process is expected to have the advantages of lower capital and operating costs, higher rate of production and saving in space and auxiliary equipment. This process will also yield nitrogen as a by-product which would be used for the manufacture of fertilizers. Out of the one million tons of ingots to be produced at the Rourkela plant annually, 750,000 tons will be manufactured by the L-D process and the balance by the open hearth process. The Consultants are expected to submit the second part of the Final Project Report by the middle of March, 1956.

4. In order to minimise any loss of time consequent upon the change over to 1 million tons capacity plant, work was continued on such portions of the plant and construction as did not involve any radical redesigning. For instance, specifications were prepared and tenders obtained for the following:—

- (1) Coke ovens and by-products plant;
- (2) Blast furnaces;
- (3) Blast furnace gas cleaning plant disintegrators;
- (4) Blast furnace gas cleaning plant electrostatic fitters;
- (5) Store houses;
- (6) Skull cracker steel construction;
- (7) Skull cracker cranes;
- (8) Scrap yard steel construction;
- (9) Slab yard steel construction.

These tenders are under examination. Specifications for the remaining sections of the Works are being finalized and arrangements made before the end of May 1956 for the manufacture and erection of these sections.

Exploration for the main raw materials, viz., iron ore, limestone, graphite and manganese, has also been undertaken with the assistance of the Indian Bureau of Mines. Iron ore deposits, etc., of I & S.

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5. Exploration for the main raw materials, viz., iron ore, limestone, dolomite and manganese, has also been undertaken with the assistance of the Indian Bureau of Mines. Iron ore deposits, etc., of the I & S.

suitable quality and quantity have been proved in the Taldih range close to Rourkela, and at present a scheme for mining iron ore is being worked out. An agreement has been entered into with Messrs. J. W. Woomer & Associates, Pittsburgh, mining consultants. Drilling for limestone is going on in the Hathibari area near Birmitrapur. At the same time action has been taken for prospecting of deposits in Bilaspur District (Madhya Pradesh). Dolomite is also being tested for suitability as to lining of the converters to be used for the L-D process.

6. The civil engineering work at Rourkela is making good progress. Office buildings are under construction and both temporary and permanent roads are being laid. At the plant site, land is being levelled, temporary offices have been constructed and water and power services are being provided. For the time being, water is being drawn from the nearby rivers Koel and Brahmani. A number of wells have been sunk and water is being pumped up into reservoirs. In view of the apprehended shortage of water during summer months, investigations have been undertaken to locate a site for a suitable reservoir which will supplement power water already available in the Brahmani river. Temporary power supply has already been arranged through the Government of Orissa. In addition, two generating sets of 150 k.w. have been installed and are under operation. High tension transmission lines covering the entire area now total 20 miles. The survey of the railway link between Rourkela and the source of iron ore (Taldih) has been completed by the Railways.

7. Project estimates have been prepared for the Rourkela township and are under scrutiny of the Government. A Master Plan of the township has been prepared and construction work is being progressing. Detailed lay out of the various sectors of the township is being worked out. Apart from the construction of temporary accommodation for the offices and staff at the site, about 100 permanent houses have been constructed and 200 more houses are under construction. Amongst the other buildings under construction are two hostels for the trainees of the Technical Institute, a hostel for German technicians and a shopping centre. Work has started on a ring road 7 miles long connecting the township to the village of Hamirpur. A temporary hospital with adequate medical staff has already been provided. A malarial survey of the area has been carried out and an anti-malaria squad has been operating for the last six months with good results.

8. The total strength of the regular employees of the Company is about 900. More than 5,000 labourers have been employed by the

contractors at the site. Every effort is made to rehabilitate the displaced persons, whose lands had to be acquired for the plant and township sites. A great majority of these have already been provided with employment.

9. Besides the initial share capital amounting to Rs. 4 lakhs, Government of India have so far advanced to the Company a sum of Rs. 6.5 crores towards expenditure on construction.

CHAPTER III

BHILAI STEEL PROJECT

In the year under review, considerable progress has been made. Negotiations were started with a Russian team of steel experts in connection with this plant in November, 1954. In January 1955, the Soviet Organisations submitted a preliminary report. An agreement was thereupon signed between the Government of India and the Government of U.S.S.R. on the 2nd February 1955 providing for technical and economical assistance for the setting up of a modern integrated iron and steel works with an initial capacity of 1 million tons of ingot to be rolled into 750,000 tons of finished products. In accordance with the agreement, the plant will be designed to produce rails, heavy structurals, sleeper bars, crossing sleepers, merchant bars and billets and provision will be made for the eventual expansion of its capacity to 1 million tons of rolled products besides 300,000 tons of foundry pig iron for sale. The site for the plant was selected in March 1955 and in terms of the agreement, the Soviet Organisations were required to submit a detailed Project Report of the proposed plant by the 15th of December 1955. In August-September, 1955, a delegation of Indian steel experts visited the U.S.S.R. and gained valuable first hand information about Russian steel works and machinery manufacturers. They studied the technical details of the plants and steel making practices in the U.S.S.R. and were fully satisfied with what they saw and learnt. On the 9th December 1955, a team of Russian experts headed by Mr. V. B. Khlebnikov, the Deputy Minister for Iron & Steel, arrived from the U.S.S.R. to present the Detailed Project Report and to be available to the Government of India during scrutiny of the Report. Indian experts and the Consulting Engineers to the Government of India who examined the Report in detail consider it exhaustive and thorough. The Report has been accepted by the Government of India with a few modifications. The Soviet Organisations have also submitted a scheme for the training of personnel in India as well as in the U.S.S.R.

2. Under the Indo-Soviet Agreement of February 1955, the Government of India have assumed responsibility for the preparation of the plant site, construction of buildings, roads, railway tracks, planning and construction of township, procurement of construction

materials etc. A Project Division was set up for discharging these responsibilities immediately after the Agreement was signed in February 1955. The headquarters of the Project Division were shifted to the site of the Works at Bhilai on the 17th of May, 1955, and a General Manager appointed in charge of it. In spite of considerable difficulties with regard to living conditions and amenities, the Project Division has done well in 1955 and satisfactory progress has been recorded on most of the preliminary works. Preliminary geological investigations in respect of iron ore, dolomite, limestone and manganese ore deposits which will be exploited for the plant were undertaken by the Indian Bureau of Mines. A team of Soviet mining experts headed by Mr. Maleshkin, Deputy Minister of Iron & Steel, U.S.S.R. arrived in India in January 1956 and had discussions with the officers of the Indian Bureau of Mines. As a result, the Soviet experts have prepared a scheme for the designing of iron ore, limestone and dolomite mines for the Bhilai Plant. Detailed topographical survey of the plant site and the area required for the township has been completed by the Survey of India. Investigations have also been made to prove the suitability of the site for construction purposes. The Tandulua Canal which passes through the selected site of the Works is being diverted over a length of about 2½ miles.

3. Acquisition of land is in progress. 3,425 acres of land have been taken possession of out of 14,000 acres to be acquired. The Railway experts are working out the details of the requirements of railway sidings for the steel plant as well as for mining areas. For providing efficient cooling arrangements and adequate water supply it has been found necessary to deepen the existing Maroda tank near the plant site and also the construction of another reservoir adjacent to it. Temporary arrangements have also been made for the supply of water both for drinking and construction purposes. The water works belonging to the Municipal Committee, Drug, has been taken over and treated water from this source will be supplied to labour camps, residential buildings and works site. In order to augment the capacity of the Drug Water Works, especially during the summer season, a weir is being constructed across the Sheonath river.

4. Electric power required for the plant will be supplied by the Madhya Pradesh Electricity Board and for this purpose they are setting up a 90,000 k.w. thermal station at Korba. The power immediately required for the construction purposes will be provided by them from the Raipur Power House.

5. Contour survey of the township site is nearing completion. The site has been demarcated according to a preliminary plan pre-

pared by the Russian Consultants. A hostel to accommodate 80 unmarried officials is nearing completion. 32 residential quarters are also under construction. The lay out plan of the first sector of the township nearest to the factory site has been prepared and construction of 300 houses has commenced. For housing construction labour, two camps are being erected near the factory site and one camp near the iron ore deposits.

CHAPTER IV

DURGAPUR STEEL PROJECT

The scheme for the setting up of the third steel plant in the public sector has made good progress during the year under review. Government decided early in 1955 that it would be necessary to construct the third steel plant to achieve the target of 6 million tons of steel ingots by 1960. In April 1955 the services of a Technical Mission from the U.K. were secured under the Colombo Plan to study the economic and technical problems connected with the establishment of a third Steel Plant during the Second Five-Year Plan Period. The Mission, which was led by Sir Eric Coates, submitted its report in August 1955 after visiting several sites in Bihar and West Bengal. It recommended the location of the plant at Durgapur. In taking into account the indication given by the Government of India about the products to be manufactured, it came to the conclusion that a plant of 1 million ton ingot capacity, to roll such products, would be not only economical but quite profitable. The recommendations contained in the report of the Mission were generally accepted by Government.

2. The Indian Steelworks Construction Company at London, a Consortium of leading British steel and other allied interests, was invited to send a delegation to discuss ways and means of constructing the plant. A delegation from the Consortium, led by its Chairman, Sir Cyril Jones, arrived in New Delhi on the 21st of December 1955. The Ministries of Finance and Iron & Steel, who were assisted by Indian experts and the Consulting Engineers—Messrs. International Construction Company—directed the discussions with the Consortium to find out whether there was a satisfactory basis for entering into a contract with a single agency for the supply of equipment and the erection of the steel plant at Durgapur. This method of entering into a contract with a single agency for the entire work, popularly called a "package deal", is expected to help in the speedy execution of the project and thereby save as much as 8 to 12 months which would otherwise be spent in the preparation of detailed plans, designs and specifications and in inviting global tenders. During these discussions the broad details of the plant were agreed upon.

3. In the middle of January 1956, the Consortium submitted its preliminary specifications and estimates. These were examined by

the Government of India with the assistance of the Consulting Engineers. Negotiations were then continued to arrive at an acceptable basis for the price and credit terms.

4. A broad agreement has been reached and it is expected that all the remaining details will be settled before the end of June 1956. The plant, machinery and equipment and a considerable part of steel structures, refractories and other materials required for the plant will be supplied by the member firms of the British Consortium. The Consortium will also carry out the entire work of erection and civil engineering at site under the supervision of the Consulting Engineers to the Government of India. The plant, equipment and material is expected to cost, in foreign exchange, about £50 million. The cost of erection, civil engineering and materials to be obtained in India is expected to be about Rs. 39 crores. In addition there will be the actual cost of shipping and freight.

5. For financing part of the foreign exchange cost of the plant, a syndicate of British banks has agreed to give credits of £11½ millions. The rate of interest will be 1% above the prevailing bank rate but the credits will be drawn upon only towards the latter half of the Second Five Year Plan.

6. The United Kingdom Government have also offered a loan of £15 millions towards the foreign exchange cost of the project. The rate of interest for this loan will be the same as that at which the U.K. Government borrow in their market, plus a small element towards administration charges. This loan will also be used only towards the latter half of the Second Five Year Plan. Meanwhile, the payments during the next two years or so will be made out of India's own resources.

7. Work preliminary to the construction of the plant at Durgapur has already commenced. An experienced officer has been appointed as Project Administrator and he has set up his field office. Some houses in the D.V.C. Colony nearby have been taken over as a temporary measure. Soil tests of the site have been conducted and a survey is being undertaken. Proceedings for the acquisition of land both for the siting of the plant and the township are in progress.

CHAPTER V

NAHAN FOUNDRY LIMITED

The Nahana Foundry was established about 80 years ago by the Maharaja of Sirmur. It was taken over by the Government of India in 1952 and a private limited company registered under the Indian Companies Act was formed in October 1952 for the management of the Foundry. The Company formally took over the management of the Foundry from 1st January 1953. The Board of Directors of this Company is composed of eight members, an equal number of whom has been nominated by the Government of India and the Himachal Pradesh Government.

2. The Foundry manufactures agricultural implements, the most popular of these being sugarcane crushers. Owing to keen competition from private manufacturers of cane crushers and the loss of the market in Pakistan, the Foundry has been unable to maintain the margin of profit which it used to earn before it was taken over by Government. Attempts have been made in recent years to develop certain new items of manufacture so as to utilise the capacity and personnel more fully. The principal items manufactured during the year upto January 1956 were:

Name of article	Quantity produced
Sultan mills dased on frames	Nos.
Nawab mills	1,018
Cast iron pan 72"	3
Do. 56"	28
Do. 48"	84
Black sheet pans	118
Chaff cutter ordinary type	62
Do. ball bearing type	47
Do. power driven	8
Kaiser-I-Hind bullock driven flour mills	1
Do. power driven flour mills	87
Maize shellers	20
Shivalik mills brass type	5
Do. ball bearing type	2
M. of I & S.	2

Name of article	Quantity produced
	Nos.
Paddy thrasher power driven	34
Meston plough	9
Centrifugal pump 6" x 5"	3
Do. 5" x 4"	15
Do. 4" x 4"	4
Do. 4" x 4" direct coupled	2
Do. 4" x 3"	1
Super sarovar	2
Saddle 'A' for P & T. Department	44,646
" 'B' "	68,366
C.I. anchor plates for Railways	20,185
Axle plate for Railways	315
Mud plug for Railways	41
Glands —do—	19
Fusible plugs —do—	37

The Foundry was able to secure some Railway and P & T orders which helped it to keep its capacity fairly engaged.

3. The Foundry has its own power house which generates and supplies electric energy to the town of Nahan besides meeting the requirements of the factory. It has also a small printing press which besides meeting the requirements of the Foundry, also undertakes work for the public, on payment.

4. The Foundry has its own sale agencies spread over the Punjab and U.P. with mobile workshops for affording repairing facilities to its customers. 38 of these agencies are run departmentally and 93 function on a commission basis. The Foundry has staff of 649 persons at its works and various hiring and sales agencies. In addition, about 100 workers are temporarily engaged every year during the cane-crushing season to cope with the heavy rush of work in the hiring and sales agencies.

5. A copy of the Directors' report, Profit and Loss Account and the Balance Sheet of the Company for the year 1954-55 is at Appendix II. The Foundry suffered a loss of about Rs. 95,000 that year. The main reason for the loss was almost continuous labour unrest in the Foundry which affected not only its production but also its sales. Besides, throughout the period the Company's products had to face competition from cheaper, often sub-standard, products of private enterprise. There were cases of infringement of the Foundry's Trade Mark and some manufacturers were prosecuted. In such

conditions of keen competition, not only had the prices and hiring charges to be reduced, but the expenditure on exhibition and advertisements had to be increased which reduced the margin of profit of the Foundry.

6. The ways and means of improving the management and working of the Foundry so as to make it a profitable concern, has been engaging the constant attention of the Government. Government of India appointed a Committee composed of Shri Radhey Lal Vyas, Member of Parliament, as Chairman and Shri P.M. Nayak, I.C.S., Deputy Secretary, Ministry of Production and Shri B. P. Sinha, Assistant Development Officer, Development Wing, Ministry of Commerce and Industry, as members to enquire into the causes of the labour unrest and to recommend measures for the all round improvement of the Foundry. The Committee has submitted its report and a decision on it is expected to be taken very shortly.

CHAPTER VI

SUBSIDIARIES

COAL

While the establishment of the main steel works is in itself a stupendous task, there has got to be developed many subsidiary industries to maintain the main steel works. The chief of these are iron ore mines and coal mines.

2. The three steel plants together will require about 5.2 million tons of coking coal per annum. A number of expert committees have gone into the question of coal reserves in the country and their utilisation. The consensus of their opinion is that while the reserves of non-metallurgical coal are sufficiently large, the same is not the case with metallurgical coal. The conservation of metallurgical coal is not a problem peculiar only to this country. It might, therefore, be expected that there would be technical advances which would find alternative methods of making iron and steel which would either eliminate the necessity for the use of metallurgical coal or at least reduce the dependence on good quality metallurgical coal to a large extent. But the immediate problem is of making the most economical use of the known reserves of metallurgical coal. Measures have been taken to conserve this coal by ensuring that the non-essential consumers adopt gradually other alternative fuels. At the same time, it has been recommended that metallurgical coal should be washed so that its ash content might be reduced. Thereby it would be possible to blend it with coking coals, which otherwise cannot be used directly for metallurgical purposes.

3. The major sources of coking coal are in Kargali/Bokaro and Jharia. A Government washery is being installed at Kargali to wash the coking coals which would be raised by Government in that area. 1.6 million tons of washed coal from Kargali will be used in the steel works at Rourkela and Bhilai. To augment these supplies, coal from Jharia will also be required. The Ministry of Iron & Steel is now exploring the best method of washing coking coals from Jharia. The steel works at Durgapur will be so designed that the coals in that area which would otherwise be unsuitable for metallurgical purposes would be used after suitable blending. The Durgapur works will use Jharia coal which will be washed at the site of

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the steel works, blended with coal from Barakar which by itself cannot be used for steel making.

4. The steel works at Bhilai are so situated that they will exploit not only the iron ore deposits in the area but make the best use of metallurgical coal from the Korba coal fields in Madhya Pradesh.

IRON ORE

5. The three steel plants will require approximately 6 million tons of iron ore. The Rourkela and Bhilai plants are so located that they will be in the vicinity of iron ore deposits. Whereas the Durgapur plant will be on the coal fields, supplies of iron ore for the Rourkela plant will be obtained from the Taldih range where investigations are at present going on. These mines will be worked by Government. The Bhilai plant will draw its supplies from the Dallirajhara range in Madhya Pradesh. These will also be worked directly by Government. Durgapur has to obtain its supplies of iron ore from either the existing mines or from mines to be developed in extension of the existing ones in Gua, which are the most accessible deposits from this place.

UTILISATION OF BY-PRODUCTS

6. In the carbonisation of coal which will be carried out at each of the steel works for the production of coke, a number of valuable by-products like coal tar, ammonia liquor and benzole will be released. It is proposed to set up at each of these works facilities for the distillation of these by-products and thereby obtain valuable chemicals which form the basis of a number of industries like the dye-stuffs, paints, varnishes, medicines, scents and antiseptics.

7. At Rourkela where steel will be produced by a new process—the L—D process—nitrogen will be available in large quantities as a by-product. It is proposed to set up a fertilizer plant at this place to produce nearly 80,000 tons of nitrogen in the shape of fertilizers.

CHAPTER VII

RECRUITMENT AND TRAINING OF TECHNICAL PERSONNEL

One of the difficult problems which this Ministry has had to face is that of technical personnel both for construction and operation of the Steel Plants. An assessment has been made, in consultation with the Russian and German Technical Consultants, of the technical personnel required for the three Plants. It is estimated that below the Foreman Category about 15,000 Technicians will be required for all the three plants together. The requirement of Supervisory Staff from Foreman upwards has been put at about 2,100. About 120 of the Supervisory Staff have to be highly qualified and experienced Engineers capable of giving higher technical directions. The task of locating such a large number of qualified technicians in our country is in itself a stupendous one; it has been made all the more difficult by the fact that Engineers with similar qualifications are also needed not only in the private sector of the iron and steel industry, which has also undertaken several schemes of expansion, but also in other heavy engineering industries and development works like transport, irrigation, electrical installations, mining and so on.

2. One way to solve this problem is to recruit Engineering Graduates with little or no experience and to have them suitably trained. In order to coordinate the demands of the three Steel Plants for qualified personnel of all grades, the recruitment has been centralised, and carried out in consultation with the Union Public Service Commission.

3. The bulk of the officers above the Foreman Category will have to be trained abroad. Steps are being taken to secure training facilities for them in different parts of the world where there are large Steel Works. A provision for training of key personnel in the design, maintenance and operation of the Rourkela Plant exists in the Agreement with the German Combine. Accordingly about 50 Engineers, who will form part of the key personnel of the Rourkela Plant, have already been recruited and sent for training in Steel Works in Germany. Similar provision also exists in the Agreement entered into with the Soviet authorities regarding the Bhilai Plant.

4. For the training of skilled workers below the Foreman Category, efforts are being made to develop training facilities in the

country. A Technical Committee has been set up to survey and assess the existing training facilities in the country and to recommend suitable steps for organizing training of the right kind and quality. Meanwhile, about 100 Trade Apprentices for the Rourkela Plant are being trained at Tatas in Jamshedpur. In addition, arrangements for the training of about 300 Apprentices at Chittaranjan Locomotive Works. Sindri Fertilizer and Jay Engineering Works have been finalised. A Technical Institute is also being constructed at Rourkela for the training of about 300 Apprentices. This Institute is expected to start functioning next year. It is hoped that by the time the Plants go into operation, sufficient number of trained skilled workers will be available to man them, although it would undoubtedly be necessary to have a few foreign technicians in top position at least for some initial period.

APPENDICES

APPENDIX I
MEMORANDUM OF AGREEMENT
BETWEEN
HINDUSTAN STEEL LIMITED
AND

INDIEN GEMEINSCHAFT KRUPP-DEMAG G. m.b. H.

Dated, at New Delhi this 21st day of July, 1955

AN AGREEMENT made this 21st day of July One thousand nine hundred and fifty five between HINDUSTAN STEEL LIMITED a Private Company incorporated under the Indian Companies Act, 1913 and having its Registered Office in the State of Delhi (hereinafter referred to as 'the said Company') of the one part and MESSRS. INDIEN GERMENISCHAFT KRUPP-DEMAG G.m.b.H., a Private Company having its REGISTERED Office and carrying on business at Duisburg in the Federal Republic of Germany (hereinafter referred to as 'the said Consultants') of the other part.

WHEREAS,

(1) By an Agreement dated the 21st day of December, 1953 (hereinafter referred to as 'the Principal Agreement') made between the President of India (which expression includes the Government of India) of the first part and Herr Alfried Krupp Von Bohlen Und Halbach the Sole proprietor of Fried Krupp, Essen, carrying on business in the Federal Republic of Germany and Messrs. Demag Aktiengesellschaft, Duisburg, a Public Limited Company incorporated in the Federal Republic of Germany of the Second and Third Parts respectively it was agreed between the parties thereto that a company incorporated under the Indian Companies Act, 1913, be formed with a view to construct develop, manage and operate a Steel Works and that the Second and Third Parties thereto be appointed as Government's Consultants with an option to form a Joint Company for the purpose upon the terms and conditions therein appearing and contained.

(2) HINDUSTAN STEEL LIMITED was accordingly formed and incorporated under the Indian Companies Act, 1913, on the 19th

day of January, 1954, having its Registered Office in the State of Delhi and a Private Limited Company under the name and style of Indien Gemeinschaft Krupp-Demag G.m.b.H. was also incorporated on the 16th day of March, 1954, having its Registered Office in Duisburg in the Federal Republic of Germany.

(3) In pursuance of the Principal Agreement the President of India representing the Government of India and the said Herr Alfried Krupp von Bohlen Und Halback the sole Proprietor of Fried Krupp, Essen and Messrs. Demag-Aktiengesellschaft, Duisburg, have transferred and assigned their rights, duties and obligations under the said Agreement to the said Company and the said Consultants respectively.

(4) The said Company is now desirous of installing an Iron and Steel Plant to an initial production capacity of one million tons upon the terms and conditions contained in the Principal Agreement modified as hereinafter appearing and contained.

NOW IT IS HEREBY AGREED AND DECLARED between the parties hereto as follows:—

1. The said Consultants shall make further necessary studies for expansion of the existing Project of 500,000 tons to a production capacity of one million tons of ingot steel per annum for the ultimate production of flat products, as may be required by the said Company.

2. The said Consultants shall submit to the Said Company within 3 months of the execution of these presents a complete Report setting forth in detail all further additional work to be done in each department for the production of the said one million tons ingot steel to be converted into flat products as aforesaid.

3. The said Consultants shall include in the aforesaid Report results of all investigations including the suitability of the employment of the process of steel making commonly known as the "LD" process.

4. The said Consultants shall include in the said Report a statement of the total cost in each major department of the Steel Works designed to produce the said one million tons ingot steel.

5. Within two months of the acceptance of the Report referred to in Clause 2 hereof and subject to mutual discussions the said Consultants shall submit:

(a) Complete technical specifications for the itemized machines and equipment as a basis for ordering these (preparation of tender papers);

(b) Consumption figures for raw materials and auxiliary materials, electric power, steam, water, etc. balance sheets of materials and power;

(c) Cost and profit calculation for determination of the economic prices of the end products.

6. It shall be the responsibility of the said Company to see that in planning the expansion to the one million tons capacity as aforesaid, the raw material resources including the supply of water and power, the combustibles and the transportation facilities for incoming raw materials and outgoing goods are ensured.

7. Subject as aforesaid the rights, duties and liabilities of the parties hereto shall be and remain as set out in the Principal Agreement altered and varied as under:—

(a) In clause 4 of the Principal Agreement the words "to commence production within a period of four years from the decision on the location of the Works" shall be replaced by the word "to commence production within a period of four years and eight months from the decision on the location of the Works",

(b) In Clause 13 of the said Agreement, the figures "500,000" and "360,000" shall respectively be replaced by the figures "10,00,000" and "720,000",

and

(c) In addition to the fees prescribed in Clause 15 of the Principal Agreement, the said Consultants shall receive a fixed fee in D. Marks of 6.20 millions, to be drawn at their option in Indian Rupees or in non-blocked D. Marks, AND the said Company shall guarantee that the Government of India in conjunction with the Reserve Bank of India will grant full facilities for the remittance to Germany of all payments due under this Agreement.

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The fixed fee shall be payable in several instalments corresponding to the progress of services rendered as detailed below:—

(i) On submission of report according to Clause 2 here of	DMs.	1,860,000
(ii) On acceptance of the said Report	DMs.	310,000
(iii) On submission of data, according to Clause 5 thereof	DMs.	930,000
(iv) D.Ms. 1,860,000 in monthly payments of D.Ms. 46,500 commencing with the signing of this Agreement	DMs.	1,860,000
(v) On commission of the expanded works and proof of the expanded performance and capacity of the Works as stated in clause 13 of the Principal Agreement	DMs.	1,240,000
TOTAL	DMs.	6,200,000

The above mentioned fee shall be subject to Indian Income-tax in accordance with the stipulations set out in the Exchange of Letters between the Production Secretary, Government of India on the one hand and Messrs. Fried Krupp, Essen and Messrs. Demag Aktiengesellschaft, Duisburg, on the other hand, dated at New Delhi 11th December and 18th December, 1953 and copies of which letters are attached hereto and marked as Annexure I.

8. In the event of the said Company not accepting—the Report referred to in Clause 2 above within a period of one month from the submission thereof this Agreement shall be deemed to be terminated at the end of this period **PROVIDED THAT** in the event of the said Company not communicating its rejection of the said Report within the period of one month from the submission thereof, the Report shall be deemed to have been accepted by the said Company and **PROVIDED THAT** nothing herein mentioned shall prejudice or affected the rights or liabilities of the parties already accrued hereunder before such termination, and **PROVIDED THAT** in the event of termination of this Agreement as aforesaid, the Principal Agreement shall be deemed to remain unaltered and unaffected by these Presents.

IN WITNESS WHEREOF the common Seal of the said Company has been hereunto affixed and the constituted Attorneys of the said Consultants have hereunto set their hands on behalf of the said Consultants the day and year first hereinabove written.

The Common Seal of HINDUSTAN STEEL LIMITED has been hereunto

affixed pursuant to a resolution of the Board of Directors of the said Company passed on the 13th day of June, 1955 in the presence of Sudhendra Nath Mozumdar, Managing Director of the said Company.

Signed by Sucha Singh Khara, S. S. Khara, Chairman of the Board of Directors of HINDUSTAN STEEL LIMITED

In the presence of the said P. N. P. N. Bhalla Under Secretary to the Government of India
Bhalla
by the said Sudhendra Nath Mozumdar, Managing Director of S. N. Mozumdar.

HINDUSTAN STEEL LIMITED in the presence of M. L. Mitra Signed, M. L. Mitra, Secretary, Hindustan SEATED AND DELIVERED by the Steel Limited.

abovenamed INDIEN GAMEINS-CHAFT KRUPPDEMAG G.m.b.H. by its constituted Attorneys Hans H. Seyboth.

E.O. Seyboth in the presence of Krishna Rau Financial Adviser, Christian Reuter, in the presence of Hindustan Steel Limited. Wolfgang Reuter
K. Krishna Rau and Wolfgang K. Krishna Rau Financial Adviser, D. J. Ram, Technical Expert, Indien Gemeinschaft Krupp-Demag G.m.b.H.

ANNEXURE 'I'

- (I) COPY OF LETTER DATED THE 11TH DECEMBER, 1953 FROM MESSRS. DEMAG AKTIENGESELLSCHAFT, DUISBURG AND MESSRS. FRIED KRUPP, ESSEN TO THE SECRETARY TO THE GOVERNMENT OF INDIA, MINISTRY OF PRODUCTION.

Sir,

In regard to the payment of income-tax and super-tax (inclusive of all other taxes and dues whatsoever leviable in India) on the consulting fee due to our Combine in regard to Technical Aid Agreement to be signed in New Delhi and discussed in our current talks, we would like to state as follows:—

The technical Aid Agreement will be implemented by our two firms from their respective domicile in Essen and Duisburg, West Germany. Services to be rendered in this connection have already been set out in detail in para. 6 of the "Memorandum on Indo-German Association in the Indian Steel Project" signed in Bonn, 15th August 1953. Though according to us the major volume of services, work and activity accruing in connection with the implementation of the Technical Aid Agreement will be performed in West Germany, we would set out below the work to be done in the two countries and comprised under the headings A to E:—

- (A) (i) Investigating the processes best suited under prevailing conditions.
- (A) (ii) Recommending the economic location of the plant after such detailed investigation as may be necessary.
- (B) Preparing a preliminary study, comprising :
 - (i) General layout of plants.
 - (ii) Estimate of the investment capital required.
 - (iii) Quantitative estimates of material and power required.
- (C) Preparing the final project report after the preliminary study has been approved. This project will comprise :
 - (i) The arrangement drawings of the plant and equipment.
 - (ii) Complete technical specifications for the itemized machines and equipment as a basis for ordering these. (Preparation of Tender).
 - (iii) Schedule giving the times of delivery construction and erection as well as the initial operation of the new Steel PLANTS.

All work in connection herewith will be done in West Germany with the exception of occasional visits by the requisite experts to India.

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All work in connection herewith will be done in West Germany with the exception of occasional visits by the requisite experts to India.

- (iv) Summary of the total costs for the various plants.
- (v) Consumption figures for raw material and auxiliary material, electric power, steam, water, etc. balance sheets of materials and power.
- (vi) Cost and profit calculations for the determination of the economic prices of the end products.
- (D) Consultation and assistance in issuing the invitation to tender for machines and equipment in ex-thercon and in making recommendation contracts.
- (E) Supervision of erection and initial operation of the plant.

All work in connection herewith will be done in West Germany with the exception of occasional visits by the requisite experts to India.

All work in connection herewith will be done in India, reimbursement for which will be made separately to our firm by the new Indo-Germany Company, such reimbursements being subject to taxation in India.

3. According to our estimate, the major portion of profits for services to be rendered will thus accrue in West Germany. However, this has not been acceptable to the Government of India. According to their views expressed during the current talks, it appears that since the services are to be rendered in connection with project to be carried out in India, the entire profits accrue or arise to the Combine in India, and as such they are wholly taxable irrespective of the fact whether the Combine become resident or not for the purposes of the Indian Income-tax Act.

4. Permit us, however, to urge that according to the German Law of taxation, the net profit out of the consulting fee earned by our Combine will be taxed in Germany irrespective of the fact whether the income accrues to the members of the Combine or to a joint company formed by them for the specific purposes of implementing the Technical Aid Agreement. This would mean that some profits will be taxed in both the countries and this is bound to cause a good deal of hardship when there is no agreement between India and West Germany for avoidance of double taxation. We did, however, approach our appropriate authorities in Germany with the request for unilateral relief. This request has not been granted; instead, we have been informed that the tax authorities would be prepared to consider reducing the German taxed by 50% on the ground of equity application submitted by our firms provided we receive similar relief in India. Without giving up our contention that the major portion of the services would be carried out, we would, where the major volume of this income would be earned in West Germany, in the circumstances, earnestly request Government of India to subject to tax only 50% of the net profits that will be made by the

Combine in this Technical Aid Agreement as long as the mode of services to be rendered is as described earlier.

5. It is understood that tax assessment under the Technical Aid Agreement will be made once only, i.e., immediately after the termination of all services in connection with the Technical Aid Agreement. For the purpose of making this assessment the net profit as certified by the German Tax Authorities will be accepted by you.

6. We further understand that our Combine will be considered as not resident in the taxable territories for the purpose of Indian Income-tax Act and that the liability to tax will be considerably smaller if this Combine is declared as "company" under Section 2(5A) (ii) of Income-tax Act than what it would be if it were treated as an association of persons. We would, therefore, request that our application when made, for declaration of the Combine as "company" may be favourably considered. In this case the present rate of taxation would be a maximum of approximately 53% of the net profit covering all taxes plus super-tax (and inclusive of all other taxes and dues whatsoever leviable on income in India).

7. We would appreciate your confirmation that our above requests will be acceptable to the Government and that you are in agreement with the Combine on these matters.

Yours faithfully,

FRIED KRUPP DEMAG A.G.

(Sd)-H. SEYBOTH, (Sd)-DR. W. THUN.

(2) COPY OF A LETTER, DATED THE 18TH DECEMBER, 1953, FROM THE SECRETARY TO THE GOVERNMENT OF INDIA, MINISTRY OF PRODUCTION TO MESSRS. DEMAG AKTIENGESELLSCHAFT, DUISBURG, AND MESSRS. FRIED KRUPP, ESSEN.

GENTLEMEN,

TECHNICAL AID AGREEMENT—NEW STEEL PLANT.

Please refer to your letter dated the 11th December, 1953, addressed by Mr. H. Seyboth and Dr. W. Thun to me on behalf of the Combine.

While in substance most of the requests contained in the said letter are acceptable to the Government of India, I have to make certain points clear.

A reference has been made in the first paragraph to "all other taxes and dues whatsoever leviable in India". The correct position is that at present the only taxes on income leviable in India are income-tax and super-tax. It may be appreciated that the Government of India cannot bind itself now not to subject to tax the income of the Combine when a new tax is generally imposed at some future date.

After discussion, we agree that, if you actually render services in the taxable territories in the manner indicated in your letter, we would regard 50% of your total net profits as being liable to tax and, therefore, subject to Indian income-tax. Under the Indian Law, tax, if any, due from the non-residents has to be deducted at the source before any sum chargeable to tax is paid to them. As an interim measure, we would agree that, for this purpose, 12½% net of the gross receipts may be assumed to be the profit. Naturally, the position will have to be reconsidered in case a greater position of the services is ultimately found to have been rendered in India.

As regards the request that "tax assessment under the Technical Aid Agreement will be made once only, i.e., immediately after the termination of all services in connection with the Technical Aid Agreement", it has to be pointed out that according to the provisions of the Indian Income Tax Act, the total income of each previous year is to be assessed separately and for the appropriate assessment chargeable to tax is being paid to a non-resident person, tax is to be deducted at source, according to certain standard rates or as may be estimated, where necessary. Hence at the time of payment of each instalment as mentioned in para 15 of the proposed Agreement, 6¼% of the instalment amount will be deducted on account of income-tax and super-tax and will be paid to the Government of India. According to the provisions of the Indian Income Tax Act, credit shall be given, for the amount so paid, at the time of each assessment. It may be appreciated that this deduction is being made on estimated basis and the liability will be finally determined only, as you suggest, after the termination of all services in connection with the Technical Aid Agreement. Further, the Income Tax Department will have normally no objection to accept the net profits as certified by the German Tax Authorities, but it will reserve its right to call for Profit and Loss Account statement and Balance Sheet as certified by your Chartered Accountants, if found necessary.

The last instalment due to you under the Agreement will not be paid until the final tax assessment has been settled and the

balance of the tax due, if any, will be deducted from this instalment. In case, however, excess deductions have already been made, the refund due to you will be paid at the same time.

As to your request that the application, when made by the Combine for being declared as "Company" under the provisions of the Indian Income Tax Act, I assure you that it will receive favourable consideration notwithstanding that such a declaration would reduce tax liability that would otherwise be incurred if the Combine were to be treated as an association of persons.

Yours faithfully,

Signed

A. K. CHANDA,

Secy. to the Government of India.

APPENDIX II

NAHAN FOUNDRY LIMITED NAHAN

ANNUAL REPORT—1954-55

DIRECTORS' REPORT

The Directors have pleasure in submitting the annual report together with the Profit and Loss Account and the Balance Sheet for the period ending 31st March, 1955.

During the period under review further efforts for developing new items of equipments for agricultural and irrigational purposes were made. The development of new implements and manufacture of items, required by Government Departments were also seriously taken up with a view to find out new resources of income. The restricted business of only one item, namely, cane crushers, on which the Foundry mainly depended in the past, has been facing unhealthy competition in the market from private sector and hence the urgency of finding out new sources of income. In regard to the new implements, Super Sarovar Bullockdriven water pump was the main item on which most of the attention and energies of the Company were focussed, as it is bound to prove a lucrative business as soon as it is developed satisfactorily. Unfortunately, however, the labour troubles directed against the General Manager, who was also the Engineer-in-Chief, considerably retarded progress in this direction.

Two important orders for the manufacture of Anchor plates for Railway and Saddles for Posts and Telegraph Department were also secured. The items of contract orders of Railway and Posts and Telegraph Departments were started towards the end of the year under report. It was a new experiment and a deviation from the normal routine working, with the result that special attention had to be given for devising efficient methods of manufacturing these items on mass scale. After incurring some initial expenses for the purposes, the manufacture of these contract items started giving hopeful results which would further be improved on future orders.

Due to our heavy overhead expenses, e.g., carriage of raw material and manufactured goods between Nahan and railhead, interest on

The Profit and Loss Account shows a loss of Rs. 94,713/9/2.

The Profit and Loss Account shows a loss of Rs. 94,715/-.

We have further capitalized a sum of Rs. 65,359/-/6 as expenses for development of new manufactures, i.e., Sarovar, Anchor plates and Saddles etc. and a provision of Rs. 27,274/9/6 @ 2% of gross revenues has been added to the "Research and Development Fund" which now totals Rs. 48,055/15/6. This fund was started last year and is designed to finance the expenses on development of new manufacture.

and is designed to finance the expenses on development and manufacture.

Our sales, compared with those of last year, have improved to some extent, and income under "Hiring of mills and Pans" has increased appreciably as detailed hereunder:—

	From 1-4-53 to 31-3-54			From 1-4-54 to 31-3-55		
	Rs.	A.	P.	Rs.	A.	P.
Total Sales	6,00,183	3	0	6,56,978	3	6
Hiring of mills and Pans	4,41,574	4	0	7,37,858	0	0

Hiring of mills and Pans 4,41,574 4 0

Your Directors take this opportunity to express their appreciation of the valuable services rendered by the Company's officers and employees at all levels. They are particularly grateful to the Ministries of Production, Railway, Finance, Commerce and Industry, Communications, Labour, Law, Works, Housing and Supply, the Comptroller and Auditor General and the Accountant General Punjab and his staff.

(Sd.)—U. L. GOSWAMI.

(Sd.)—FATEH SINGH.

(Sd.)—G. S. SINGH.

(Sd.)—N. C. MALLIK.

(Sd.)—H. B. BHAR.

S. DHAR.

(Sd.)—P. K. CHAKRAVARTI.

Trading and Profit and Loss Account for the period from 1st April, 1954 to 31st March, 1955.

To opening Stocks	12,04,356	9	0	By sales																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Profit and Loss Account—contd.

To Stationery & Printing Charges	8,380 10 0	By Rent realised	3,892 10 0
To Journals & Publications	562 8 6	By interest received	2,444 15 0
To Postage & Telegrams	2,416 10 0	By Profit of Power House	13,784 8 0
		By Profit of Printing Press	88 0 6
To Carriage and Cartage	21,865 12 0		
To Subsidy on Foodgrains	14,368 4 9		
To Repair and Maintenance :			
(i) Building	1,529 14 9		
(ii) Machinery	2,252 7 9		
(iii) Furniture and fittings	225 2 3		
(iv) Electric fittings	395 7 3		
	4,403 0 0		
To Rent, Rates and Taxes	11,713 12 6		
To Medical Aid	7,906 1 0		
To Advertisement charges	20,402 14 6		
	6,19,343 0 6		
			8,96,585 14 4
To Legal Charges	1,350 0 0	To loss C/O to Balance Sheet	94,713 9 2
To Uniforms	405 10 9		
To Unforeseen Expenses	423 12 0		
To Bank charges	475 11 6		
To Electric charges	6,000 0 0		

38

Profit and Loss Account—contd.

To Provident Fund contribution	21,498 8 0
To Pensions	372 0 0
To Gratuity	9,000 0 0
To Telephone charges	1,052 5 0
To Employees' State Insurance	2,941 2 0
To General Expenses	882 3 9
To Foundry club expenses	480 0 0
To Interest paid on securities	1,316 4 3
To Interest on loan payable to Government of India (Rs. 3,50,000) at the rate of 4½ per cent.	16,620 15 0
To Exhibition Charges	5,123 15 6
To Workmen Compensation	26 9 6
To Condemned Assets & Stores	17 7 0
To Directors' Fee and T. A.	1,255 14 0
To Audit Fee	10,495 0 0
To Depreciation Suspense (On Building constructed account of which not received from P. W. D.)	4,309 0 0
To Depreciation on assets other than Hiring Stock	46,031 8 0

39

Profit and Loss Account—contd.

To Stationery & Printing Charges .	8,380 10 0	By Rent realised	3,892 10 0
To Journals & Publications . . .	562 8 6	By interest received	2,444 15 0
To Postage & Telegrams	2,416 10 0	By Profit of Power House	13,784 8 0
		By Profit of Printing Press	88 0 6
To Carriage and Cartage	21,865 12 0		
To Subsidy on Foodgrains	14,368 4 9		
To Repair and Maintenance :			
(i) Building	1,529 14 9		
(ii) Machinery	2,252 7 9		
(iii) Furniture and fittings	225 2 3		
(iv) Electric fittings	395 7 3		
	4,403 0 0		
To Rent, Rates and Taxes	11,713 12 6		
To Medical Aid	7,906 1 0		
To Advertisement charges	20,402 14 6		
	6,19,343 0 6		8,96,585 14 4
To Legal Charges	1,350 0 0	To loss C/O to Balance Sheet	94,713 9 2
To Uniforms	405 10 9		
To Unforeseen Expenses	423 12 0		
To Bank charges	475 11 6		
To Electric charges	6,000 0 0		

38

Profit and Loss Account—contd.

To Provident Fund contribution	21,498 8 0
To Pensions	372 0 0
To Gratuity	9,000 0 0
To Telephone charges	1,052 5 0
To Employees' State Insurance	2,941 2 0
To General Expenses	882 3 9
To Foundry club expenses	480 0 0
To Interest paid on securities	1,316 4 3
To Interest on loan payable to Government of India (Rs. 3,50,000) at the rate of 4½ per cent.	16,620 15 0
To Exhibition Charges	5,123 15 6
To Workmen Compensation	26 9 6
To Condemned Assets & Stores	17 7 0
To Directors' Fee and T. A.	1,255 14 0
To Audit Fee	10,495 0 0
To Depreciation Suspense (On Buildings constructed account of which not received from P. W. D.)	4,309 0 0
To Depreciation :	
(a) On Assets other than Hiring Stock	46,031 8 0

39

Profit and Loss Account—contd.

(b) On Hir- ing stock	2,13,430	6	0				
Less con- demned Stock written off							
Subject to sale off	1,64,737	4	3	48,693	1	9	94,724 9 9
Scrap.							1,64,737 4 3
To Condemned as above							1,173 9 3
To Loss of canteen							
To Provision for Research & De- velopment Fund				27,274	9	6	
GRAND TOTAL				9,91,299	7	6	
							GRAND TOTAL 9,91,299 7 6

(SOM DATT),
Accountant.

(RAM CHAND),
General Manager.

NAHAN FOUNDRY LIMITED, NAHAN BALANCE SHEET AS AT 31ST MARCH, 1955.

Capital and Liabilities.		Property and Assets.	
CAPITAL—		FIXED CAPITAL EXPENDITURE—	
“Authorised Capital”:		(i) Foundry (As per Schedule annexed)	
10,000 shares of Rs. 1,000 each 100,00,000 0 0			
Issued and Subscribed Capital:		(ii) Power House	
4000 shares of Rs. 1000 each			
(i) Shares issued as fully paid up in pursuant to any contract without payments being received in cash 4000 shares of Rs. 1000 each		(iii) Canteen	
(ii) Shares issued for payment in cash nil shares of Rs. nil each		(iv) Printing Press	
2. RESERVES—		PRELIMINARY EXPENSES—	
As per last balance sheet		40,00,000 0 0 Expenses on Development of New Manufacture—Temporarily Capi- talized:	
Less.—Debentures stating the nature of security		As per last Balance sheet	
Any sinking Fund		Addition during the year	
3. OTHER FUNDS—		STORES AND SPARE PARTS—	
(i) Research & Development Fund at the rate of 2 per cent. of Gross Income		At Nahon Foundry	
As per last Balance sheet		At Power House	
Add for Current year		At Agencies	
Less paid		PROVISION STORES AT COST—	
		LOOSE TOOLS:	
		Previous total cost	
		Additions	
		Total	
		Less Deductions	
		Less Depreciation at the rate of 15 per cent. upto 31st March 1954	

Balance Sheet—contd.

(ii) Labour Welfare Fund :

Previous Balance	17,861 12 2
Adjustment during the year	18 13 3

17,880 9 5

Less—Paid for Radio

Service	317 13 9
Expenses of Adult School	218 14 0
Relief to Employees	462 0 0
Stipends paid	320 0 6

1,318 12 3

(iii) Gratuity Fund :

Previous Balance	31,321 1 0
Less.—Amount paid	5,946 0 9

25,375 0 3

Add.—Transfer from Profit and Loss account

9,000 0 0

16,561 13 2

RESERVE FOR BAD AND DOUBTFUL DEBTS.—

(i) Foundry	9,554 13 0
Less adjusted	5 12 0

9,549 1 0

(ii) Power House

171 15 6

9,721 0 6

LOANS.—Secured from Government of India

3,50,000 0 0

Add.—Interest payable at the rate of 4½ per cent.

25,312 8 0

3,75,312 8 0

From 1st April 1954 to 31st March 1955

5,500 4 0

75,141 8 6 31,168 4 3

LIVESTOCK AND VEHICLES—

(a) Lorries and Trucks

(i) Previous cost	73,766 5 0
Less Disposed of	20,436 0 0

653,330 5 0

Less Depreciation upto 31st March 1954

56,977 5 0

Less adjusted

16,425 0 0

40,552 5 0

Add.—Depreciation from 1st April 1954 to 31st March 1955 at the rate of 25 per cent.

3,194 7 0

43,746 12 0 9,583 9 0

(b) Thela with Pneumatic Tyres.—

Previous total cost

678 0 0

Less.—Depreciation at the rate of 20 per cent upto 31st March 1954

598 3 0

From 1st April 1954 to 31st March 1955

15 15 0

614 2 0

63 14 0

STOCK IN TRADE (at cost).—

As certified by General Manager :

(a) Foundry

7,96,865 1 3

(b) Canteen

178 5 9

(c) Printing Press

277 0 6

7,97,320 7 6

Balance Sheet—contd. SECURITY DEPOSITS :

(a) Foundry	1,47,571 7 4
(b) Power House	7,604 3 0

1,55,175 10 4

(ii) Consignment stock (at cost as certified by General Manager)

66,669 8 6

(iii) Work in Progress (at cost as certified by General Manager)

95,635 13 0

9,59,625 13 0

LIABILITIES :

(a) For Goods supplied—

(i) Foundry	54,496 10 3
(ii) Canteen	303 15 9

54,800 10 0

Less—Deductions & Transfers

35,28,107 4 10

3,03,594 13 6

32,24,512 7 4

Less.—Depreciation upto 31st March 1954

4,27,804 2 10

For this year

48,693 1 9

14,76,497 4 7 17,48,015 2 9

Missing Mills as per last Balance Sheet

3,894 8 3

ADJUSTMENT DUE TO RE-VALUATION OF STOCK :

as per last Balance Sheet

1,78,173 1 5

BOOK DEBTS :

(a) P. W. D Nahan	1,03,610 13 0
(b) Himachal Rosin & Turpentine Factory, Nahan	535 8 6
(c) Sirmur Tea Estate, Dehra Dun	11,079 14 9
(d) Sirmur Stationery & Printing Press (Successors H. P. Government Press)	7,798 8 6
(e) Trade Debtors	3,63,667 3 0
(f) Due from Agents & Sub-agents etc.	12,502 1 4
(g) Due from cultivators at agencies	2,16,734 6 6
(h) Power House consumers	5,977 5 3

DEPRECIATION SUSPENSE—

(i) Foundry :

Opening Balance	28,920 0 0
Additions	4,309 0 0

33,229 0 0

(ii) Power House :

Opening Balance	11,474 8 0
Additions	1,676 4 6

13,150 12 6

46,379 12 6

(i) Canteen customers 9 0 0 7,21,914 13 1

CLAIMS IN DISPUTE :

E. P. T. Deposit 39,506 0 0
 Claims with Railway 107 1 6
 Machinery & Stock at Lyallpur 7,459 2 11
 47,072 4 5
 50,60,114 12 3

C. O. 54,86,207 5 0

Liabilities and Capital
 Brought Forward

Property and Assets

Brought Forward 50,60,114 12 3

Advances:

(a) To Employees :—

(i) Against Pay . 791 5 6
 (ii) Against T. A. 4,172 4 9
 (iii) Against purchases—
 (a) Foundry . 128 5 0
 (b) Canteen . 151 11 0
 (iv) Loan to Em-
 ployees . 793 0 0
 (v) Compensation . 80 0 0
 (vi) Challan of
 Foundry Truck . 173 0 0
 6,289 10 9
 11,970 12 0
 (b) Advances to Suppliers
 (c) Advances against commission to
 agents 69,818 8 3 88,078 15 0

Deposits :

(a) Foundry 3,698 0 0
 (b) Agencies 1,333 0 0
 5,031 0 0

Prepaid Expenses 1,353 0 0

Investments :

3 Per cent Victory Loan at cost 1,000 0 0
 P. N. B. Ltd., Fixed Account
 N. S. C. (Against Employees Provi-
 dent Fund) 26,185 0 0 27,185 0 0

Cash in Hand and other Balances:

Cash in hand at Nahan 4,929 9 9
 Cash in hand at agencies 68,902 12 11
 Cash in Transit 8,150 0 0
 With Bankers on Current Account—
 Nahan 79,334 2 3
 With Bankers (Power House) 717 14 3
 Imprest —
 Head Office 74 7 9
 Agencies 59 12 6 134 4 3 1,62,168 11 5

Profit and Loss—

Last Balance (loss) 47,562 5 2
 Loss this year 94,713 9 2 1,42,275 14 4

54,86,207 5 0

54,86,207 5 0

SOM DATT,
 Accountant.

RAM CHAND,
 General Manager.

Report of the Auditors to the Shareholders.

We have audited the above Balance Sheet of the Nahani Foundry Ltd., Nahani, as at 31st March, 1955 and also the Profit and Loss Account for the year ended upon that date and report that :—

- (a) We have obtained all the information and explanations we have required.
 (b) In our opinion the above Balance Sheet and the Profit & Loss account are drawn up in conformity with Law.
 (c) Subject to the enclosed audit comments, the Balance Sheet exhibits a true and correct view of state of Company's affairs according to the best of our information and the explanation given to us and as shown by the books of the Company at Nahani.
 (d) And in our opinion books of account have been kept by the Company as required by Section 130 of the Indian Companies Act.

G. H. P. O. SAW,
Accountant General, Punjab.

C. D. SAKLANT,
Examiner.

NAHAN FOUNDRY LIMITED, NAHAN.
FIXED CAPITAL EXPENDITURE ON 31ST MARCH, 1955.

Assets	Total cost on 31-3-1954	Additions	Total	Deductions and Transfers	Cost as on 31st March 1955	Depreciation		Total	Balance
						Upto 31st March 1954	From 1st April 1954 to 31st March 1955		
								Rate	Per cent.
Land									40,081 1 9
Buildings Factory	40,081 1 9	..	40,081 1 9	..	40,081 1 9	5	95,327 15 0 1,50,067 0 0
Buildings Non-Factory	2,38,477 12 9	6,917 2 3	2,45,394 15 0	..	2,45,394 15 0	87,429 11 0	7,898 4 0	2 1/2	49,859 12 3 1,51,245 0 0
Plant & Machinery	2,31,078 0 0	26 14 0	2,31,104 14 0	..	2,31,104 14 0	45,212 8 3	4,647 5 0	10	1,96,511 8 9 1,42,626 9 9
	3,29,318 12 3	8,819 6 3	3,39,138 2 6	..	3,39,138 2 6	1,80,872 0 3	15,847 6 0		
					Less adjusted for machinery	7 13 6			
					written off.	1,80,664 2 9			
Furniture & Fixture								6	17,911 13 0 33,073 14 9
Type writers	50,108 2 0	879 4 0	50,987 6 0	1 10 3	50,985 11 9	15,800 11 0	2,111 2 0	15	3,367 14 3 1,317 12 3
Telephone Installation	4,685 10 6	..	4,685 10 6	..	4,685 10 6	3,135 5 3	232 9 0	10	1,092 2 3 617 1 3
Electric fittings	1,709 3 6	..	1,709 3 6	..	1,709 3 6	1,023 9 3	68 9 0	10	13,928 3 11 16,113 14 9
Library	29,229 11 11	812 6 9	30,042 2 8	..	30,042 2 8	12,137 12 11	1,790 7 0	7	514 4 0 941 1 0
Patterns	1,426 11 0	28 10 0	1,455 5 0	..	1,455 5 0	443 7 0	70 13 0	10	14,816 9 11 21,906 15 6
Medical Instruments	28,021 7 5	8,702 2 0	36,723 9 5	..	36,723 9 5	12,382 8 11	2,434 1 0	20	560 6 3 135 15 0
	726 8 3	15 4 0	741 12 3	45 7 0	696 5 3	561 8 9	34 0 0		
					Less adjusted for item written off.	35 2 6			
Guns & Ammunitions						526 6 3		25	400 1 0 101 15 0
Electric fittings at agencies	502 0 0	..	502 0 0	..	502 0 0	366 1 0	34 0 0	10	1,924 8 0 3,313 3 0
Radio & Amplifier set	4,719 11 0	518 0 0	5,237 11 0	..	5,237 11 0	1,556 6 0	189 3 0	25	3,095 15 9 567 9 0
Radio at Agencies	3,663 8 9	..	3,663 8 9	..	3,663 8 9	2,906 12 9	253 2 0	25	1,246 5 0 759 4 9
Moulding Boxes	2,005 9 9	..	2,005 9 9	..	2,005 9 9	993 3 0	1,341 15 0	10	3,266 1 0 12,077 11 0
	6,000 0 0	9,343 12 0	15,343 12 0	..	15,343 12 0	1,924 2 0	37,320 14 0		4,03,823 9 4 6,04,936 1 6
	9,71,753 14 10	37,062 13 3	10,08,816 12 1	47 1 3	10,08,769 10 10	3,66,545 11 4			
						43 0 0			
						3,66,502 11 4			

SOM DATT,
Accountant.

R. L. CHOPRA,
*Assistant Examiner,
 Outside Audit Department.*

RAM CHAND,
General Manager..

Report of the Auditors to the Shareholders.

We have audited the above Balance Sheet of the Nahan Foundry Ltd., Nahan, as at 31st March, 1955 and also the Profit and Loss Account for the year ended upon that date and report that :—

- (a) We have obtained all the information and explanations we have required.
 (b) In our opinion the above Balance Sheet and the Profit & Loss account are drawn up in conformity with Law.
 (c) Subject to the enclosed audit comments, the Balance Sheet exhibits a true and correct view of state of Company's affairs according to the best of our information and the explanation given to us and as shown by the books of the Company at Nahan.
 (d) And in our opinion books of account have been kept by the Company as required by Section 130 of the Indian Companies Act.

G. H. P. O. SAW,
Accountant General, Punjab.

C. D. SAKLANT,
Examiner.

NAHAN FOUNDRY LIMITED, NAHAN.
 FIXED CAPITAL EXPENDITURE ON 31ST MARCH, 1955.

Assets	Total cost on 31-3-1954	Additions	Total	Deductions and Transfers	Cost as on 31st March 1955	Depreciation		Rate	Total	Balance
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								Per cent.		
Land										40,081 1 9
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Buildings Non-Factory	2,38,477 12 9	6,917 2 3	2,45,394 15 0	..	2,45,394 15 0	87,429 11 0	7,898 4 0	5	95,327 15 0	1,50,067 0 0
Plant & Machinery	2,31,078 0 0	26 14 0	2,31,104 14 0	..	2,31,104 14 0	45,212 8 3	4,647 5 0	2½	49,859 13 3	1,81,245 0 9
	3,29,318 12 3	8,819 6 3	3,39,138 2 6	..	3,39,138 2 6	1,80,672 0 3	15,847 6 0	10	1,96,511 8 9	1,42,626 9 9
					Less adjusted for machinery	7 13 6				
						1,80,664 2 9				
					written off.					
Furniture & Fixture										
Type writers	50,108 2 0	879 4 0	50,987 6 0	1 10 3	50,985 11 9	15,800 11 0	2,111 2 0	6	17,911 13 0	33,073 14 9
Telephone Installation	4,685 10 6	..	4,685 10 6	..	4,685 10 6	3,135 5 3	232 9 0	15	3,367 14 3	1,317 12 3
Electric fittings	1,709 3 6	..	1,709 3 6	..	1,709 3 6	1,023 9 3	68 9 0	10	1,092 2 3	617 1 3
Library	29,229 11 11	812 6 9	30,042 2 8	..	30,042 2 8	12,137 12 11	1,790 7 0	10	13,928 3 11	16,113 14 9
Patterns	1,426 11 0	28 10 0	1,455 5 0	..	1,455 5 0	443 7 0	70 13 0	7	514 4 0	941 1 0
Medical Instruments	28,021 7 5	8,702 2 0	36,723 9 5	..	36,723 9 5	12,382 8 11	2,434 1 0	10	14,816 9 11	21,906 15 6
	726 8 3	15 4 0	741 12 3	45 7 0	696 5 3	561 8 9	34 0 0	20	560 6 3	135 15 0
					Less adjusted for item written off.	35 2 6				
						526 6 3				
Guns & Ammunitions	502 0 0	..	502 0 0	..	502 0 0	366 1 0	34 0 0	25	400 1 0	101 15 0
Electric fittings at agencies	4,719 11 0	518 0 0	5,237 11 0	..	5,237 11 0	1,556 6 0	368 2 0	10	1,924 8 0	3,313 3 0
Radio & Amplifier set	3,663 8 9	..	3,663 8 9	..	3,663 8 9	2,906 12 9	189 3 0	25	3,095 15 9	567 9 0
Radio at Agencies	2,005 9 9	..	2,005 9 9	..	2,005 9 9	993 3 0	253 2 0	25	1,246 5 0	759 4 9
Moulding Boxes	6,000 0 0	..	6,000 0 0	..	6,000 0 0	1,924 2 0	1,341 15 0	10	3,266 1 0	12,077 11 0
	9,71,753 14 10	9,343 12 0	15,343 12 0	..	15,343 12 0	3,66,545 11 4	37,320 14 0		4,03,823 9 4	6,04,936 1 6
		37,062 13 3	10,08,816 12 1	47 1 3	10,08,769 10 10	43 0 0				
						3,66,502 11 4				

SOM DATTA,
Accountant.

R. L. CHOPRA,
*Assistant Examiner,
 Outside Audit Department.*

RAM CHAND,
General Manager..

GOVERNMENT OF INDIA

Ministry of Iron & Steel

SUMMARY 1955-56

The Ministry of Iron & Steel was created by a Presidential Order dated the 28th of May 1955 and the following subject allotted to it:

- (a) Government industrial undertakings for the production of iron and steel.
- (b) Government-owned foundries.

2. Steel is basic to industrialisation. But the production of steel within the country has always been much less than the demand. This deficiency became markedly evident during the last year of the First Plan period. Rapid development in all fields, particularly in industry, which is envisaged in the Second Five Year Plan, cannot be thought of except on the basis of steel. The key-note of the new policy was struck by the Commerce & Industry Minister, Shri T. T. Krishnamachari, when he announced early in 1954 that the target for the next Plan must be 6 million tons of ingot steel. Whatever the immediate reaction to that was, today if there is any doubt left, it is only whether this target is enough or whether events may not outdate it sooner than one imagines. This target is proposed to be attained as follows:

	Existing (in million tons)	Target for 1960 (in million tons)
<i>I. By the expansion of existing works—</i>		
Tata Iron and Steel works.	0.9	2.0
Indian Iron & Steel Works	0.5	0.9
Mysore Iron & Steel works	0.03	0.1
<i>II. By establishment of new works in the public sector—</i>		
Rourkela Plant	..	1.0
Bhilai Plant	..	1.0
Durgapur Plant	..	1.0
TOTAL	1.43	6.0

The decision to constitute a separate Ministry to deal exclusively with the establishment of new works in the public sector underlines the determination of the Government to achieve this target.

3. The Ministry of Iron & Steel which came into being on the 15th of June 1955 took over from the Ministry of Production the responsibility for the planning and execution of the two Steel Works at Rourkela and Bhilai and also the administration of the Nahan Foundry Limited, Nahan (Himachal Pradesh). The planning and execution of the third steel plant which was to be located either in West Bengal or in Bihar was taken over from the Ministry of Commerce & Industry.

4. Considerable progress has been made with the planning and construction of the Steel Works at Rourkela. The site has been got ready and the township is under construction. Tenders have been received for two main sections of the plant viz., for the coke ovens and the blast furnaces. Negotiations are going on for the best method of speedy construction of the other sections of the plant. Work has begun in Bhilai for the preparation of the site, the building of the township and other preliminary works. A team of Russian experts led by the Deputy Minister for Iron & Steel in the U.S.S.R., Mr. Khlebnikov, presented the Final Project Report to the Government of India on the 9th December, 1955. This Report has been examined by the Government of India with the assistance of Indian experts and the Consulting Engineers have been agreed upon and a contract has been concluded for the supply of equipment and erection of the Steel Works according to the Project Report as modified. Certain sections of the plant are expected to go into operation in 1958 and the Steel Works as a whole by December, 1959.

5. The United Kingdom Steel Mission which came out under the Colombo Plan to survey and report on the establishment of a third Government steel Plant submitted its report in August 1955. The Mission recommended Durgapur in West Bengal as the site for the location of this plant. The recommendations of the United Kingdom Steel Mission were generally accepted by the Government of India. To advise the Government of India on technical matters connected with all steel questions and in particular with the construction of the third Steel Plant at Durgapur, a well known firm of Consulting Engineers—The International Construction Company Ltd., London—was appointed as the Consulting Engineers to the Government of India. At the same time, with a view to explore the possibility of the plant, a delegation was invited and

and specifications in the middle of January, 1956. These were examined by the Government of India with the assistance of the Consulting Engineers and further discussed with a delegation from the British Consortium. An agreement has been reached on the broad structure of the contract to be entered into with the Consortium. The detailed specifications and the final quotations will be submitted by the Consortium by the middle of May. If the final Contract is concluded by the end of June 1956, it is expected that certain sections of the plant will go into operation in the middle of 1959 and the entire Steel Works by December, 1960.

6. While the establishment of the main Steel Works is in itself a stupendous task, many subsidiary industries have got to be developed to maintain the main Steel Works; the chief of these are iron ore mines and coal mines. The three steel plants together will require about 5.2 million tons of coking coal per annum. To make the best use of the limited supplies of metallurgical coal in the country, the Ministry of Iron and Steel is exploring the best method of washing coking coals and of suitably blending them with other coals which by themselves cannot be used for metallurgical purposes.

Approximately 6 million tons of iron ore will be required for the three steel works. Steps have been taken to exploit the iron ore deposits in the vicinity of the steel plants.

In the carbonisation of coal which will be carried out at each of the steel works for the production of coke, a number of valuable by-products like coal tar, ammonia liquor and benzole will be released. It is proposed to set up at each of these works facilities for the distillation of these by-products and thereby obtain valuable chemicals which form the basis of a number of industries like the dye stuffs, paints, varnishes, medicines, scents and antiseptics.

At Rourkela where steel will be produced by a new process—the L-D process—nitrogen will be available in large quantities as a by-product. It is proposed to set up a fertilizer plant at this place to produce nearly 80,000 tons of nitrogen in the shape of Nitro-limestone.

7. The construction and operation of the steel plants will require a large number of technical personnel. It is proposed to set up a technical training institute below the Force to produce nearly 80,000 tons of nitrogen in the shape of Nitro-limestone.

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and specifications in the middle of January, 1956. These were examined by the Government of India with the assistance of the Consulting Engineers and further discussed with a delegation from the British Consortium. An agreement has been reached on the broad structure of the contract to be entered into with the Consortium. The detailed specifications and the final quotations will be submitted by the Consortium by the middle of May. If the final Contract is concluded by the end of June 1956, it is expected that certain sections of the plant will go into operation in the middle of 1959 and the entire Steel Works by December, 1960.

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In the carbonisation of coal which will be carried out at each of the steel works for the production of coke, a number of valuable by-products like coal tar, ammonia liquor and benzole will be released. It is proposed to set up at each of these works facilities for the distillation of these by-products and thereby obtain valuable chemicals which form the basis of a number of industries like the dye stuffs, paints, varnishes, medicines, scents and antiseptics.

At Rourkela where steel will be produced by a new process—the L-D process—nitrogen will be available in large quantities as a by-product. It is proposed to set up a fertilizer plant at this place to produce nearly 80,000 tons of nitrogen in the shape of Nitro-limestone.

7. The construction and operation of the steel plants will require a large number of technical personnel—about 15,000 technicians below the Foreman category and about 2,100 of the rank of Foreman and above. Owing to a dearth of engineers, qualified and experienced, in the iron and steel industry, it is proposed to recruit Engineering Graduates with little or no experience and to have them suitably trained. In order to coordinate the demands of the three Steel Plants, the recruitment of qualified personnel has been

centralised. For this, a special committee has been set up with a member of the Union Public Service Commission as Chairman. Steps are being taken to secure training facilities for the engineers and technicians both within the country and abroad.

8. The Nahan Foundry was established about 80 years ago by the Maharaja of Sirmur. It was taken over by the Government of India in 1952 and a private limited company registered under the Indian Companies Act was formed in October, 1952 for the management of the Foundry. The Company formally took over the management of the Foundry from 1st January, 1953. The Board of Directors of this Company is composed of eight members, an equal number of whom has been nominated by the Government of India and the Himachal Pradesh Government. The Foundry manufactures agricultural implements, the most popular of these being sugar-cane crushers. Owing to keen competition from private manufacturers of cane crushers and the loss of the margin of Pakistan, the Foundry has been unable to maintain the margin of profit which it used to earn before it was taken over by Government. Attempts have been made in recent years to develop certain new items of manufacture so as to utilise the capacity and personnel more fully.

By a Presidential Order dated the 21st February 1956 the control of the Nahan Foundry has been transferred to the Ministry of Commerce and Industry and the control of the Mysore Iron and Steel Works transferred from the Ministry of Commerce and Industry to the Ministry of Iron and Steel.

STEEL 1956.



MINISTRY OF IRON & STEEL

CONTENTS

	PAGES
1. The Target	1—2
2. Steel Making	3—6
3. The Rourkela Steel Works	7—8
4. The Bhilai Steel Works	9—10
5. The Durgapur Steel Works	11
6. Subsidiaries	12—13
7. Townships	14
8. Profitability	15—17
9. Annexure I	19
10. Annexure II	20—21



A contract for the supply of equipment for the Bhilai Steel Works being signed between India and the U. S. S. R. in New Delhi.

THE TARGET

The amount of steel which a country makes or uses is generally regarded as a measure of its industrial development. By this standard, the United States leads, producing over a 100 million tons a year. Next comes the Soviet Union with over 40 million tons. Britain and Germany follow with 20 million tons each. India has so far been very much behind, producing only a little over a million tons a year. With the emphasis on industry in the Second Five Year Plan, the country as a whole is getting conscious of the shortage of steel. The deficiency was markedly evident during the last year of the First Plan period. Government of India made a very rapid survey of the requirements and estimated that by 1960 the country would require 6 million tons of ingot steel or about 4.5 million tons of finished steel products (Annexure I). Today it looks as if this target may have to be increased sooner than one imagined. The target of 4.5 million tons is proposed to be attained as follows:

	Existing (in million tons)	Target for 1960 (in million tons)
I. By the expansion of existing works—		
Tata Iron and Steel Works	0.78	1.50
Indian Iron & Steel Works	0.33	0.80
Mysore Iron & Steel Works	0.03	0.10
II. By the establishment of new works in the public sector—		
Rourkela Plant	..	0.72
Bhilai Plant	..	0.77
Durgapur Plant	..	0.79
TOTAL	1.14	4.68

The allocation of products to be rolled by each of the steel works is given in Annexure II.

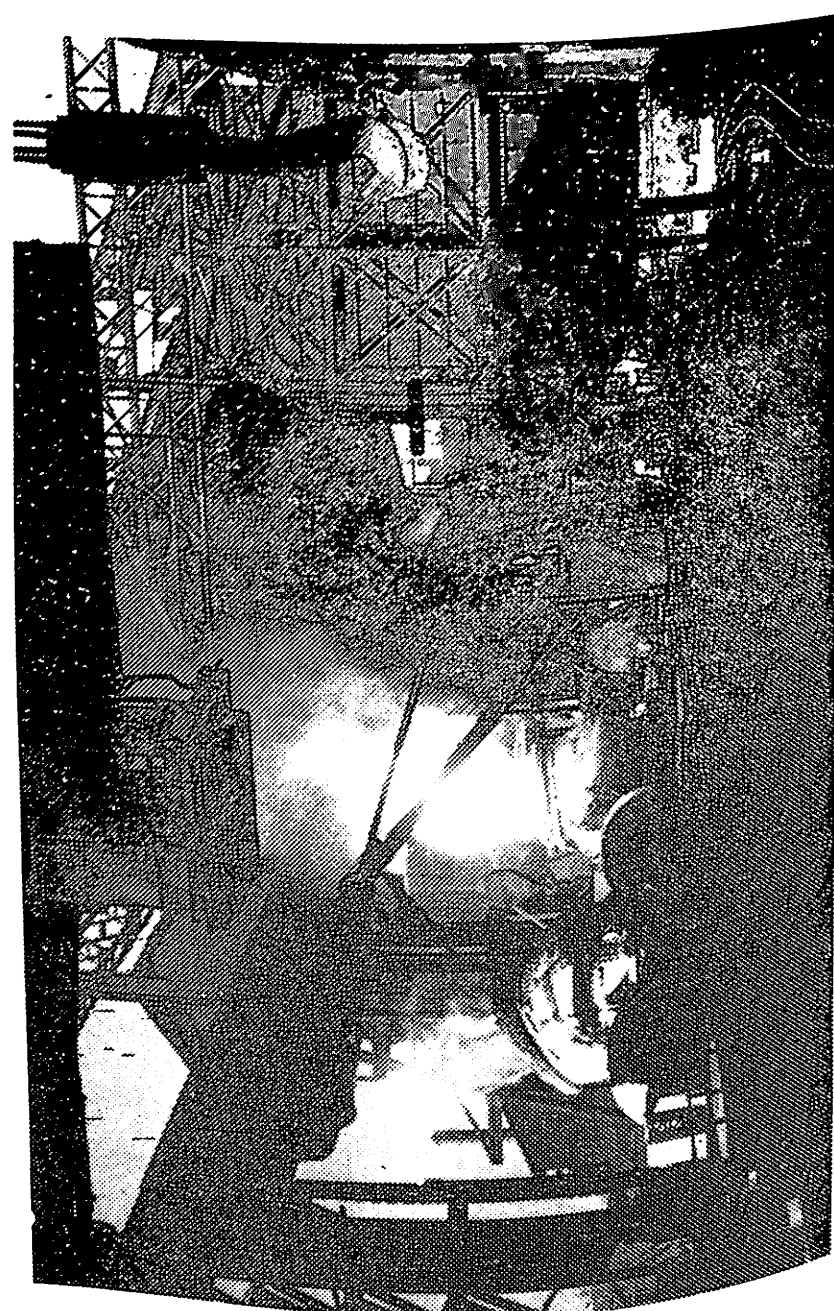
In the private sector, the greatest expansion will be that of the Tata Iron & Steel Company. Besides considerable modernization of their existing plants, new sections will be added increasing the output to a total of 2 million tons of ingot steel or 1.5 million tons of rolled products. The first phase of the Tata's programme will increase their productive capacity from 780,000 tons to 931,000 tons of saleable steel a year. This programme is estimated to cost about Rs. 43 crores. For the second phase of the programme which aims at increasing their productive capacity to 1.5 million tons of

rolled products, Tatas have entered into an agreement with Henry J. Kaiser & Co. of the U.S.A. for technical assistance. It is estimated that this programme would cost over Rs. 65 crores and will be completed by May 1958.

The expansion plan of the Indian Iron & Steel Company also is being executed in two stages, raising the capacity to a total of 800,000 tons of saleable steel per year. This expansion is estimated to cost about Rs. 35 crores. The Government of India are assisting this expansion financially by the advance of interest bearing loans to the extent of Rs. 7.9 crores and a special advance of Rs. 10 crores from the equalisation fund. In addition IISCO have secured a loan of Rs. 13 crores from the World Bank, which has been guaranteed by the Government. The second phase of IISCO's expansion programme will be completed by 1958-59.

There is a programme of expansion suggested for the third existing steel works—the Mysore Iron & Steel Works at Bhadravati. The details of this programme have not yet been finalised and are still under examination.

The gap of nearly 3 million tons which will be left even after the expansion of the existing works is proposed to be closed by the establishment of three steel plants of a million ton capacity each at Rourkela, (Orissa), Bhilai (Madhya Pradesh) and Durgapur (West Bengal). One would ask why these places have been chosen. The answer is fairly simple. For efficient and economic production a steel plant should be so situated that it can receive raw materials and send out the finished products in a smooth and even manner at as little cost as possible. Raw materials are needed in large quantities. Each of the steel plants will consume every year about 2 million tons of iron ore, a little less than 2 million tons of coal, 550,000 tons of limestone, 300,000 tons of dolomite, 100,000 tons of manganese ore and thousands of tons of other materials. A place which is near the sources of coal and iron ore and if possible, those of the other raw materials would, of course, be the ideal. But unfortunately there are not many places where coal of the right kind is found along side the iron ore. Nevertheless, the sites chosen are the most suitable from the point of view of proximity of all these raw materials. There are some other sites like Bokaro in Bihar which are equally close to the sources of raw materials but there have been other difficulties with these sites, like lack of good communications or water supply. With the anxiety to attain the target as rapidly as one could, these sites have been left to be exploited at a later stage.



A View of a portion of the Steel Melting Shop.

STEEL MAKING

Large scale production of iron and steel has developed gradually over centuries. Improvements have been directed towards the efficient and economic mining of iron ore, coal and limestone and to the economic manufacture of higher and higher qualities of steel. In order to separate iron from the ore it has to be refined by fire to remove impurities such as earth, sulphur, phosphorus, etc. In the early days charcoal was used. Coal lacks the mechanical strength and the chemical qualities required to smelt iron ore. It was not until about the middle of the 18th century that an efficient method of converting coal into a form where it could be used for smelting iron ore, was discovered. With this discovery of the manufacture of "coke" from coal, the possibility of refining large quantities of iron ore was thrown open.

1856 is the next land-mark in the history of iron and steel when Sir Henry Bessemer discovered a method of producing steel quickly and cheaply from molten pig iron. The Steel Age may be said to have commenced in that year. Developments in the iron and steel industry have since followed closely the developments in transport and economic generation of power, until today steel works are of dimensions unimagined even in the recent past.

After the raw materials are mined and transported to the steel works, coke is prepared from coal. Coal is "cooked" in "coke ovens" which are large chambers made of refractory material. Coal which is fed at the top of these ovens is heated to release its volatile matter. The residue, which is called "coke" is pushed out at the bottom. This will begin to burn if exposed to air in its hot condition. It is, therefore, cooled by spraying water on it and then removed. The coke is crushed and graded to the required sizes.

The iron ore is also prepared by crushing, screening, sintering, etc., in order to improve its quality. It is then heated in a "blast furnace" in order to separate the impurities from the iron. In effect, a blast furnace is a large vertical steel cylinder which is lined on the inside with refractory bricks. Refractory bricks are made of special types of clay which have properties of resisting heat. These steel cylinders are as high as 100 ft. are fitted with nozzles at their base through which hot air is forced by blowers which are in turn driven by gas or steam turbine engines. The top of the steel cylinder is so made that iron ore, coke and limestone can be poured into the cylinder even while the furnace is in operation. First iron ore is poured from trucks which in the language of the steel-maker are called "skips". Iron ore is followed

by a skipful of coke and limestone. Once the furnace is lighted, air is blown through the nozzles and this helps to keep the coke burning at intense heat. As this burning goes on, limestone combines with the impurities to form what is known as "slag". At the same time gases rush upwards acting on the ore. These hot gases together with the limestone convert the ore into a spongy mass which then turns into molten iron. This trickles down through the coke and collects at the bottom of the furnace. The slag which is lighter floats on top of the molten metal. Iron and slag are taken out of the furnace at regular intervals. The molten metal is drawn off or "tapped" through a hole once every four hours or so. The metal which in this molten condition is white hot rushes; throwing sparks and is either taken into ladles to the next stage where it is converted into steel or is led into a channel from where it goes into a series of sand moulds where the iron cools. These moulds along the channel resemble a litter of pigs lying around their mother. Hence the name "pig iron".

In the process discovered by Bessemer and developed later to overcome some of the drawbacks, molten iron is poured into a large vessel lined with refractory material and air is blown through it under pressure. The oxygen in the air burns the carbon in the iron as also most of the impurities like silicon and manganese. The heat generated by this burning in itself keeps the iron in a molten condition. As the impurities are burnt, there is the most brilliant display of fireworks as the flames leap dazzling high into the air. During this process the metal is boiling. As the flame subsides, the blast is kept on to remove the phosphorus out. A modern development is the use of oxygen to speed up the process and to control it. Use of oxygen allowed some scrap steel to be added.

While the Bessemer process heralded the Steel Age, it was the next development "the open hearth process" which increased significantly the production of steel and brought about rapid improvements in the equality of steel. In this process, which lends itself to the manufacture of higher quality steels, large quantities of scrap steel are added. The open hearth furnace looks like a shallow covered swimming bath. The walls and roof are made of heat-resisting refractory bricks. Modern open hearth furnaces make 200 to 300 tons of steel at a time. From one side are charged the raw materials, iron, scrap and limestone, in appropriate quantities. The charging is done in long rectangular boxes by means of heavy overhead cranes. The high temperature required in the furnace is obtained by burning the gases coming from the coke ovens and tar which also is obtained as a by-product from the coke ovens.

Yet another process which has been very recently developed is what known as "the Linzer Dusen Stahl" or "L.D." process. In this the molten iron is poured into huge egg-shaped converter vessels which can hold 35 to 40 tons and oxygen is blown at an enormous speed for about 20 minutes or so. This is a quick and economical way of making steel but so far it has been used only in making what are known as "soft steels" of the kind required for making sheets. Yet another method of making steel is by the use of electric power to generate heat. This is known as the "electric furnace process".

Steel which is made by any of these processes is in a molten condition. This molten steel is poured into receptacles called "ingot moulds" and allowed to cool in them. When they are taken out, they are heavy rectangular blocks weighing anything from 3 to 10 tons. These are called "ingots". Ingots are then "stripped" from their moulds and transferred to rectangular furnaces situated generally below ground level. These furnaces called "soaking pits" bring the ingots to the correct temperature for working or "rolling".

These ingots are then "rolled" between heavy rollers to produce the required shapes and sizes—plates, sheets, rails, channels, beams, etc. The heavy ingots cannot be passed directly to the various finishing mills. They are first reduced to smaller sections in a "blooming" or "slabbing" mill. Here the white hot ingots are squeezed in between rollers which are brought closer and closer together. At the end of this initial thinning process, the ingot is reduced to a "bloom" usually about 5" square. When the ingot is squeezed into a thinner section for rolling plates, the pieces are called "slabs" instead of "blooms". The blooms or slabs are again reheated before being passed to the finishing mills. At the finishing mills, the rollers have passed to give the particular shape desired—a rail, a channel, a beam or a plate.

Instead of being cast into ingots for rolling, molten steel may be poured directly into sand moulds of the desired shape to form steel castings.

Again, instead of being finished into rolled products, blooms may be heated and hammered or "forged" to make other desired shapes like wheels and axles for locomotives and wagons.

At all the three steel works in the public sector the processes for the manufacture of coke from coal and iron from iron ore will be practically the same. At Bhilai and Durgapur steel will be made by the open hearth process. At Rourkela which will specialise in the manufacture of plates and sheets, most of the steel will be

made by the L.D. process and some by the open hearth process. The rolling mills at the three plants will be different depending on the nature of the products to be rolled (Annexure II). At Durgapur there will also be a special plant to hammer blooms to form wheels, tyres and axles for the Railways.

THE ROURKELA STEEL WORKS

Rourkela is a small village 257 miles from Calcutta on the main railway line between Calcutta and Bombay. It is at the confluence of the rivers Sankh and Koel which go to form the Brahmani. Iron ore for this plant will be drawn from the rich deposits of Taldih which are about 60 miles away. Coal will be obtained largely from the Bokaro and Kargali fields and partly from Jharia. Limestone will come from the nearby deposits of Hathibari or Birmitrapur. The multi-purpose dam at Hirakud over the river Mahanadi will supply about 40,000 to 60,000 KW of power. The balance of the demand for electric power will be met by a big thermal station of approximately 75,000KW which is being set up at site. This plant, which is being set up with the technical and financial association of the two well-known German firms of Krupp and Demag, will specialise in the production of flat products.

An outstanding feature of the Rourkela Plant will be the adoption of the Linzer Dusen-Stahl oxygen blowing process which was developed in Austria and is now employed in about eight steel works in the world. This process is expected to have the advantages of lower capital and operating costs, higher rate of production and saving in space and ancillary equipment. While these would be very significant advantages, an incidental but more interesting advantage would be the utilisation of the by-products for the manufacture of fertilizers and a series of important chemicals. L.D. process will require large quantities of oxygen. In obtaining this oxygen from the atmosphere nitrogen will be available as a by-product. This would be used for the manufacture of fertilizers. In turn, by-products of this fertilizer industry together with the by-products from the coke ovens would be used for the manufacture of various chemicals.

The German Combine—Indien Gemeinschaft Krupp Demag—has submitted its Final Project Report for a one million ton plant. This report has been scrutinised by the Government with the help of experts and approved with certain modifications. The main sections of the plant as approved are:—

- (a) A coking plant with a capacity of about 1.6 million tons of coal "through-put" per annum;
- (b) A blast furnace plant consisting of 3 furnaces to start with (to be increased to 4 furnaces later on) with a rated output of 1,000 tons per furnace per day;

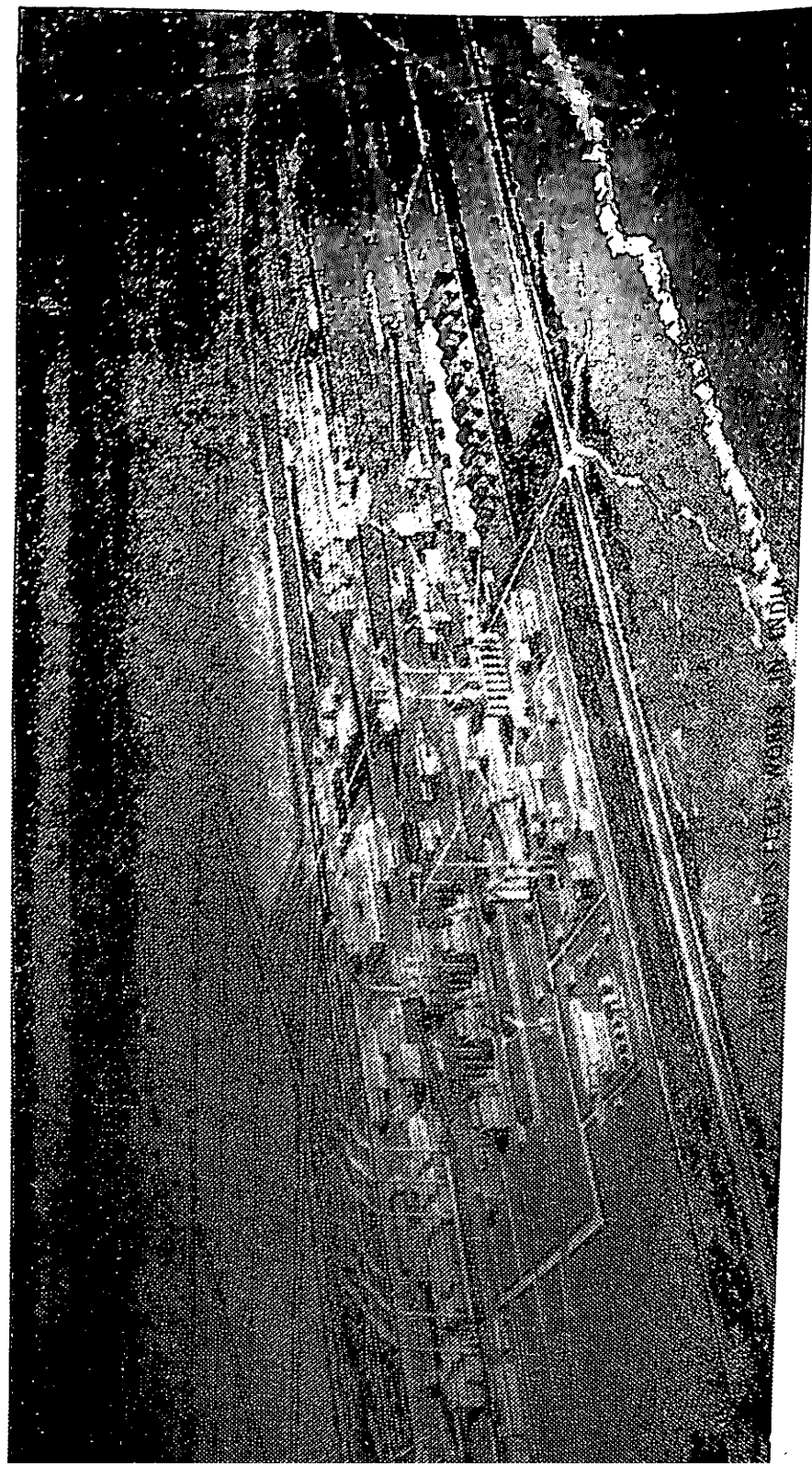
- (c) A steel melting shop employing mainly the oxygen blowing process (L.D. Process) ; and
- (d) A large rolling mill plant of modern design for hot and cold rolling, including a broad strip mill for strips upto 1.525 mm in width.

Tenders for the following have been obtained and are under examination :—

- (1) Coke ovens and by-products plant;
- (2) Blast furnaces ;
- (3) Blast furnace gas cleaning plant disintegrators ;
- (4) Blast furnace gas cleaning plant electrostatic fitters ;
- (5) Store houses ;
- (6) Skull cracker steel construction ;
- (7) Skull cracker cranes ;
- (8) Scrap yard steel construction ;
- (9) Slab yard steel construction.

A group of German firms has been invited to submit tenders by the middle of May 1956 for the various sections of the rolling mills. Global tenders have been invited for the thermal power station.

It is expected that iron will be produced at Rourkela towards the end of 1958 and full production of steel reached by 1960. The plant is estimated to cost approximately Rs. 128 crores.



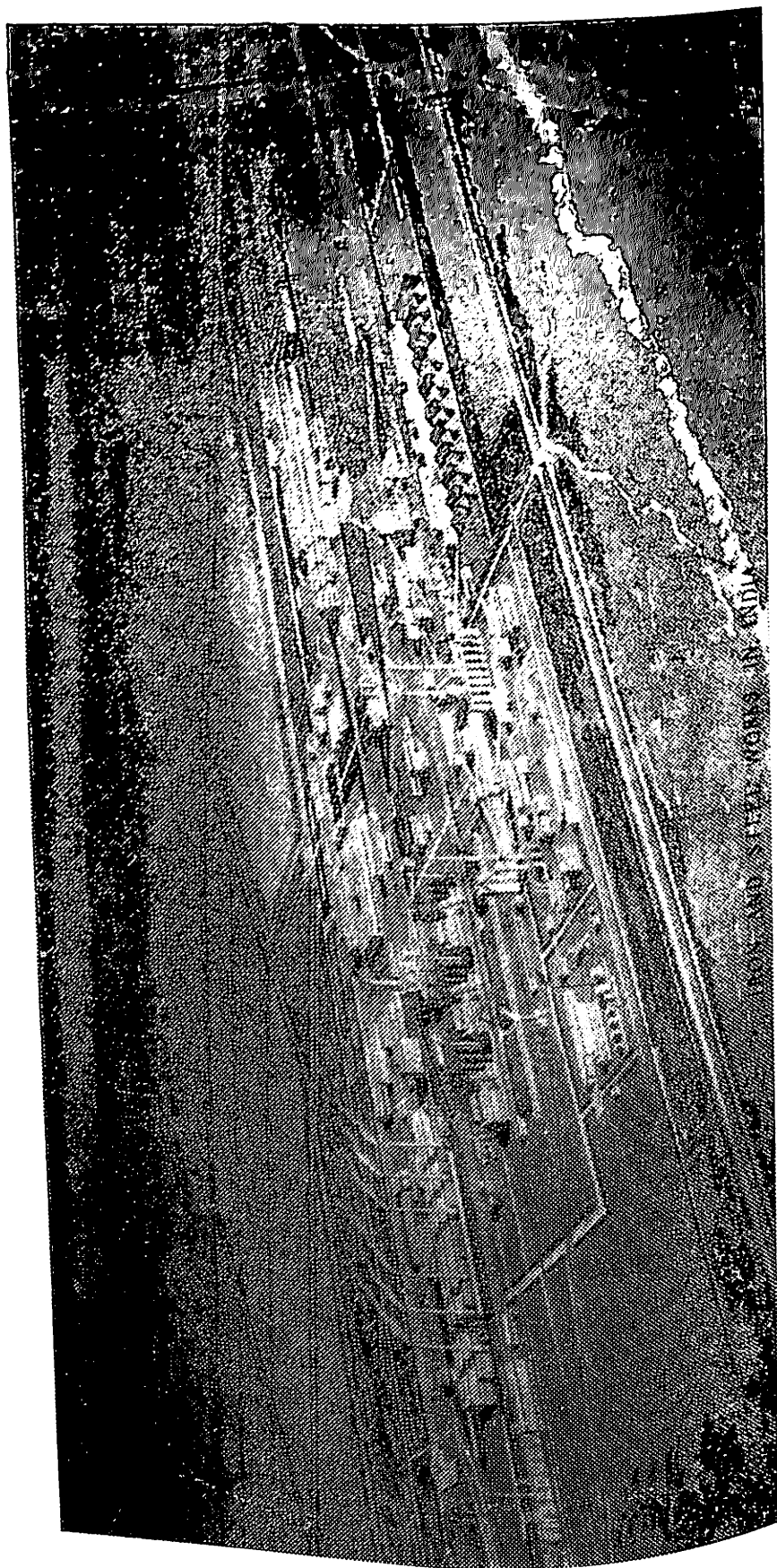
Artist's View of the proposed Bhilai Steel Works.

THE BHILAI STEEL WORKS

Bhilai is 156 miles from Nagpur on the main Bombay—Calcutta line. Iron ore for this plant will be obtained from the Dalli Rajahra Pahar deposits about 60 miles away. Coal to be used at this plant will be a blend of metallurgical coal from Bokaro-Kargali fields and Jharia fields and the otherwise non-coking coal of Korba. Limestone is found in the vicinity of the works. This plant will thus exploit not only the iron ore deposits of Madhya Pradesh but will also make the best use of the coal from the Korba fields which otherwise cannot be used for metallurgical purposes. Water will be supplied by the Tandula canal. The main power will come from a thermal station at Korba about 100 miles away. The steel works are being set up with the technical and financial assistance of the Government of the USSR and will consist of the following principal departments:

- (a) a coke oven plant;
- (b) a blast furnace plant and auxiliary equipment;
- (c) a steel melting plant;
- (d) facilities for casting, handling and stripping ingots;
- (e) soaking pits;
- (f) mills and plants to roll the various products;
- (g) a sintering plant;
- (h) plants for the production, supply and transmission of water, power and gas for the works and the township;
- (i) plants for the recovery of by-products; and
- (j) repair and other auxiliary shops.

According to the agreement with the Government of the USSR, the Soviet Organizations will undertake the responsibility for the technical supervision of the construction of the steel works, erection, installation and commissioning of the plant, machinery and equipment. They will also supply most of the plant, machinery and equipment. Indian personnel in the plant, machinery and equipment will be paid Rs. 63 crores. The Government of India will bear the cost of the installation and operation of the plant, machinery and equipment.



Artist's View of the proposed Bhilai Steel Works.

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Bhilai is 156 miles from Nagpur on the main Bombay—Calcutta line. Iron ore for this plant will be obtained from the Dalli Rajahra Pahar deposits about 60 miles away. Coal to be used at this plant will be a blend of metallurgical coal from Bokaro-Kargali fields and Jharia fields and the otherwise non-coking coal of Korba. Limestone is found in the vicinity of the works. This plant will thus exploit not only the iron ore deposits of Madhya Pradesh but will also make the best use of the coal from the Korba fields which otherwise cannot be used for metallurgical purposes. Water will be supplied by the Tandula canal. The main power will come from a thermal station at Korba about 100 miles away. The steel works are being set up with the technical and financial assistance of the Government of the USSR and will consist of the following principal departments:

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- (j) repair and other auxiliary shops.

According to the agreement with the Government of the USSR, the Soviet Organizations will undertake the responsibility for the technical supervision of the construction of the steel works, erection, installation and commissioning of the plant, machinery and equipment. They will also supply most of the plant, machinery and equipment and train Indian personnel in the USSR. The Soviet Organizations will be paid Rs. 2.5 crores for their services and approximately Rs. 63 crores for the plant and equipment. The plant and equipment will be initially supplied on credit repayable in 12 equal instalments. Interest will accrue at $2\frac{1}{2}$ per cent per annum. The expenditure on supplies from India and the engineering work to be done at Bhilai is estimated at Rs. 47 crores making a total of Rs. 110

crores for the works exclusive of the salaries of Soviet experts and Indian staff at Bhilai.

The Soviet Organizations submitted the detailed project report on the 9th of December 1955. This was examined by the Government of India and accepted with certain modifications on the 8th of March 1956. Contracts have been concluded for the supply of equipment worth Rs. 55 crores and structural steelwork worth approximately Rs. 8 crores. The first consignment of equipment is expected towards the end of June, 1956. Three coke oven batteries, two blast furnaces, two open hearth furnaces and a blooming mill will be commissioned by the 31st of December 1958 and the rest of the steel works by the 31st of December 1959.

THE DURGAPUR STEEL WORKS

This plant will be at Durgapur 110 miles from Calcutta on the main railway line between Calcutta and Delhi. Iron ore for this plant will come from the well-known deposits of Gua which also supply TISCO and IISCO. The coking coals of Jharia will be blended with the weakly coking coals of Barakar. Water will be taken from the Damodar river which flows along side the site. The main supply of electric power will be from a big thermal station which will be erected close to the steel works. There will be a smaller plant as stand-by at the steel works.

Broad agreement has been reached with a British Consortium of manufacturers known as the Indian Steel-works Construction Co., for the construction of this plant. This contract with a single agency for the entire work is expected to help in the speedy execution of the project and thereby save as much as eight to twelve months which would otherwise be spent in the preparation of detailed plans, designs and specifications and inviting global tenders. Under the agreement reached with the British Consortium, the value of F.O.B. supplies will be nearly £50 million. This is subject, in the final quotation to be submitted in May 1956, to a variation of plus or minus 5% for errors and omissions from the original proposals. The estimate of rupee expenditure in India is Rs. 40 crores.

Part of the foreign exchange needed for this project will come from two sources:—

- (a) a loan of £11.5 million from a syndicate of banks in the United Kingdom;
- (b) a loan of £15 million from the United Kingdom Government.

The bank loan will be taken, as at present arranged, mainly during the years 1957—1960 and will be repaid during the years 1960—1964. The loan will carry interest at 1% over the bank rate for the time being but subject to a minimum of 4½%. Although the present bank rate is 5½% it would probably go down by the time the loan is taken.

The loan to be advanced by the United Kingdom Government would be repaid after the loan from the banks. The rate of interest for this loan would be the United Kingdom Government's borrowing rate at the time the loan is taken plus a small element to cover administrative charges.

SUBSIDIARIES

The sources of the four principal raw materials, iron ore, coal, limestone and dolomite for each of the plants have been mentioned.

Iron ore for the Rourkela steel works will be obtained from Taldih 60 miles away. Investigations are now going on at site to determine the exact location of the deposits to be worked. Mining of iron ore at Taldih will be undertaken by the Government directly. An American firm of engineers has been appointed as Consultants to advise on the technical problems of mining iron ore at this place. Similarly the Government will undertake directly the mining of iron ore at Dalli Rajahra. At the request of the Government of India the Soviet Organizations have submitted a preliminary project report. The mines will be designed and worked with the technical assistance of the Government of the USSR. Equipment for these mines will also be supplied by that country on ordinary commercial terms. The steel works at Durgapur will obtain iron ore from either the existing mines or from mines to be developed in extension of the existing ones in Gua, which are the most accessible deposits from this place.

The three steel plants together will require about 5.2 million tons of coking coal per annum. A number of expert committees have gone into the question of coal reserves in the country and their utilisation. The consensus of their opinion is that while the reserves of non-metallurgical coal are sufficiently large, the same is not the case with metallurgical coal. The conservation of metallurgical coal is not a problem peculiar only to this country. It might, therefore, be expected that there would be technical advances which would find alternative methods of making iron and steel which would either eliminate the necessity for the use of metallurgical coal or at least reduce the dependence on good quality metallurgical coal to a large extent. But the immediate problem is of making the most economical use of the known reserves of metallurgical coal. Measures have been taken to conserve this coal by ensuring that the non-essential consumers adopt gradually other alternative fuels. At the same time, it has been recommended that metallurgical coal should be washed so that its ash content might be reduced. Thereby it would be possible to blend it with coals which otherwise cannot be used directly for metallurgical purposes.

The major sources of coking coal are in Kargali/Bokaro and Jharia. A Government washery is being installed at Kargali to

wash the coking coals which would be raised by Government in that area. 1.6 million tons of washed coal from Kargali will be used in the steel works at Rourkela and Bhilai. To augment these supplies, coal from Jharia will also be required. The Ministry of Iron & Steel is now exploring the best method of washing coking coals from Jharia. The steel works at Durgapur will be so designed that the coals in that area which would otherwise be unsuitable for metallurgical purposes would be used after suitable blending. The Durgapur works will use Jharia coal which will be washed at the site of the steel works, blended with coal from Barakar which by itself cannot be used for steel making.

The steel works at Bhilai will use a blend of metallurgical coals from Kargali and Jharia and coal from Korba which by itself is not fit for metallurgical purposes.

Limestone and dolomite for the Rourkela and Bhilai works will be quarried directly by the Government. For the Durgapur steel works, the proposal is to obtain at least in the initial stages limestone from the existing sources at Birmitrapur in Orissa.

Mention was made earlier of the utilisation of the by-products at the Rourkela steel works, for the manufacture of fertilizers and other chemicals.

In the carbonisation of coal which will be carried out at each of the steel works for the production of coke, a number of valuable by-products like coal tar, ammonia liquor and benzole will be released. It is proposed to set up at each of these works facilities for the distillation of these by-products and thereby obtain valuable chemicals which form the basis of a number of industries like dyestuffs, paints, varnishes, medicines, scents and antiseptics.

TOWNSHIPS

It is estimated that for the operation of the three steel plants the following staff would be required:

- (i) 120 experienced engineers who would be entrusted with higher technical direction.
- (ii) 1200 qualified engineers.
- (iii) 10000 skilled workers of different categories.
- (iv) 7000 semi-skilled workers.

For the second category of qualified engineers, the problem has been one of finding the requisite number of experienced engineers. To overcome this, young engineers, mechanical, electrical, metallurgical and chemical, will be sent, after some initial training, abroad for advanced courses. A large number of applications have been received and these are now under scrutiny in consultation with the Union Public Service Commission.

For the training of skilled workers, efforts are being made to develop training facilities within the country. A technical committee has surveyed the existing training facilities and expects to submit its recommendations before the end of April 1956. To augment the facilities available within the country and to maintain a regular inflow, after the works come into operation, training centres will be established at each of the steel works.

Experienced engineers who would be entrusted with higher technical direction are very few in the country. With the expansion programme of the existing steel works it has not been possible, nor would it be desirable, to recruit any significant number of people from those works. Initially the shortage will be replaced by the employment of foreign technicians. These will be replaced by Indian engineers as they gain experience.

A modern industrial township is being developed at each of the three sites to accommodate the large number of workers. It is estimated that each of these townships, which will have all the modern conveniences and will be laid out such as to be capable of accommodating larger numbers of workers who would be required when the capacity of each of the plants is increased, will cost Rupees twelve to fifteen crores.

PROFITABILITY

It might well be asked why each of the plants is of 1 million tons capacity and not more or less. A balance has to be struck between a large number of small works and one or two very big works. If there are too many plants, then the central organisation to co-ordinate the activities of all would become uneconomical. Generally, it would also require greater investment and involve higher overheads. On the other hand, one single plant of two or three million tons capacity would mean a heavy strain on the transport system which would have to carry the raw materials to and the finished products away from the works. In choosing three plants of 1 million tons capacity each, advantage has been taken of the assistance coming from the various countries in expediting the construction of the works. This apart, from a technical point of view, a plant of 1 million tons capacity can with slight adaptation be expanded to produce 1.3 million tons of steel with relatively minor additional investment. A plant of this capacity has the internal problem of handling 6 to 7 million tons of materials in and out of the works and between departments. While the layout of each of the works has been so chosen that this could be done effectively and economically, provision has been made in the layout for the works to be expanded to double its capacity at each of the places so that at a later stage if it were decided to increase the production of steel, there would not be much difficulty in doing so.

The requirements of constructional material and operational equipment for a steel works will differ according to the capacity of the works and the nature of the products. But allowing for variations in design and also in sizes and numbers of each type of equipment, the manufacturing capacity required in the country, to produce these constructional materials and items of equipment would be practically of the same nature. For a steel plant of 1 million tons ingot capacity, the following will be required:

Building bricks	45 million pieces
Stone blocks	100,000 sq. m.
Fire clay bricks and fire clay products	90,000 tons
Silica bricks and silica products	40,000 tons
Magnesite bricks and magnesite products	3,000 tons
Chrome-magnesite bricks and chrome-magnesite products	13,500 tons
Asbestos cement sheets	700,000 sq. m.
Concrete for structures	500,000 cu. m.
Prefabricated reinforced concrete structures, pipes, etc.	120,000 cu. m.

Asphalt concrete	40,000 tons
Rails	10,000 tons
Railway sleepers	10,000 tons
Structural steelwork	100,000 tons
Castings	6,000 tons
Pipe work	10,000 tons
Locomotives	24 Nos.
Specialist rolling stock	175 Nos.
Electrical motors	about 8,500 Nos.
Electrical transformers	about 100 Nos.
Cranes of various types and sizes	about 50 or 60 Nos.
Machine tools of various types and sizes	about 100 Nos.
Instruments	Of various types.

At present the country is capable of manufacturing practically all the constructional material but very little of the steelwork, castings or equipment. If the industrial projects proposed for the Second Five Year Plan are all completed, then it is estimated that almost 80% in value of the equipment and material required for a steel works of 1 million tons capacity could be produced within the country. The balance of 20% which will have to be imported will consist mainly of very heavy castings, forgings, specialist machine tools, some optical stores and intricate instruments.

The capital investment on the three steel works themselves would be approximately Rs. 360 crores. Besides there would be the capital expenditure for working new mines for iron ore, limestone, etc., the cost of the townships and the cost of ancillary services.

The average retention price i.e. the price which is earned by the existing steel works is Rs. 393 per ton of steel sold. The average controlled selling price of steel products is about a hundred rupees more than this; while, the world market price will be over Rs. 150 to Rs. 200 more than the average controlled selling price. One of the objects of producing the country's own requirements of steel is to sell it at reasonable prices. Assuming that the output of the new steel works will be sold at about the same level as the existing retention price—say Rs. 400 per ton, the gross sale value of the steel and pig iron sold by each of the steel works would be approximately Rs. 30 to 35 crores per year.

According to the estimates of the technical advisers to the Government the direct cost of production i.e. of materials, fuel, water and power, labour, staff and maintenance, would be well below Rs. 200 per ton. For each of the steel works, therefore, the excess of revenue over current expenditure or gross profits would be

Rs. 15 to 20 crores per annum. Experience shows that the average life of a steel plant is about thirty years. It could be longer if the plant is maintained properly. Even assuming a shorter life of twenty to twenty-five years, a provision of Rs. 5 crores per year would be more than adequate to meet the needs of depreciation in the strict sense of the term i.e., expenditure needed to maintain the plant in the same state and efficiency as it was when new. Each plant will, therefore, have Rs. 10 to 15 crores per year from its internal resources, which could be used for building other plants. These resources would amount to about Rs. 200 crores in about five years of production. By that time the cost of new plants would have become less largely because of the ability of the country to make a large portion of these. It should, therefore, be possible to build at least two plants with those 200 crores of rupees.

Serial
No.

ANNEXURE I

Categories		Demand (in thousand tons)
1	Heavy rails and fish plates	265
2	Heavy structurals	485
3	Broad and parallel flanged beams	75
4	Crossing sleepers	30
5	Sleeper bars	170
6	Medium and light structurals	510
7	Deformed and prestressed concrete bars	30
8	Rounds and flats 1/2" and above	780
9	Rounds and flats below 1/2"	360
10	Spring steel	30
11	Wheels, tyres and axles	70
12	Tinplates	150
13	Plates 3/16" and above	300
14	Wire and wire products	100
15	Wire ropes	5
16	Tool and alloy steel	10
17	Stainless steel	15
18	Hoops and box strappings	60
19	Bloom and billets for forging	100
20	Sheets and strips (hot rolled)	650
21	Strips upto 12"	60
22	Strips over 12"	145
23	Skelp (for tubes and pipes)	100
TOTAL FINISHED STEEL		4,500
24	Semins for re-rollers	700

ANNEXURE II

ROURKELA :

1. Plates—3/16" and above	200,000
2. Sheets and strips (hot rolled)	380,000
3. Strips up to 12"	40,000
4. Strips over 12"	100,000
	<u>720,000</u>

BHILAI :

1. Rails, standard gauge	100,000
2. Rails, narrow gauge	10,000
3. Railway sleeper bars	90,000
4. Standard and broad-flanged beams, channels, angles and other light and heavy structural sections (beams with section height up to 24")	284,000
5. Rounds from 7/8" to 3" dia. and squares with sides from 7/8" to 3"	121,000
6. Flats from 2" to 5" wide	15,000
	<u>620,000</u>
7. Billets for re-rolling at outside rolling mills from 2" x 2" to 3" x 3" cross-section	150,000
	<u>770,000</u>
	<u>300,000</u>

Pig iron

DURGAPUR :

1. Heavy forging blooms	10,000
2. Merchant sections	240,000
3. Forging billets	60,000
4. Sleeper bars	60,000
5. Light sections	200,000
6. Forging blooms	30,000
7. Axles	12,000
8. Wheels and tyres	28,000
	<u>640,000</u>
	<u>150,000</u>
9. Billets for sale	790,000
	<u>350,000</u>

Pig iron

TATA IRON & STEEL CO. LTD. :

1. Heavy rails and fish plates	135,000
2. Heavy structurals	110,000
3. Crossing sleepers	30,000
4. Sleeper bars	50,000
5. Medium and light structurals	297,000
6. Rounds and flats	144,000
7. Spring steel	4,000
8. Wheels, tyres and axles	30,000
9. Plates 3/16" and above	100,000
10. Blooms and billets for forging	22,000
11. Sheets and strips (hot rolled)	150,000
12. Strips up to 12"	42,000
13. Skelp (for tubes and pipes)	106,000
	<u>1,220,000</u>
14. Semis for re-rollers	280,000
	<u>1,500,000</u>

INDIAN IRON & STEEL CO. LTD. :

1. Heavy rails and fish plates	100,000
2. Heavy structurals	110,000
3. Broad and parallel flanged beams	40,000
4. Medium and light structurals	120,000
5. Rounds and flats	160,000
6. Blooms and billets for forging	10,000
7. Sheets and strips (hot rolled)	120,000
	<u>660,000</u>
8. Semis for re-rollers	140,000
	<u>800,000</u>