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FOURTH PLAN

**REPORT OF THE WORKING GROUP ON
STRUCTURALS**

(GROUP IX—NOVEMBER, 1964)



PLANNING GROUP ON MACHINERY INDUSTRIES

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**REPORT OF THE WORKING GROUP IX—
STRUCTURALS
PLANNING GROUP ON MACHINERY INDUSTRIES
(FOURTH PLAN)**

1. Introduction

Pursuant to the decision taken at the fifth meeting of the Planning Group for Machinery Industries held on the 18th September 1963, a number of Working Groups were constituted by the Ministry of Steel and Heavy Industries *vide* their Memorandum No. M. E. Ind. 9(16)/63(iii), dated the 30th September 1963. Working Group No. IX was for structurals, cranes, sluice gates and related items.

2. Composition of Working Group IX

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Jessop & Co. Ltd.,
63, Netaji Subhas Road,
Calcutta-1.
2. P. P. Dani, Esq.,
Construction Adviser &
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6. F. V. Badami, Esq., *Convenor*
Development Officer,
Department of Technical Development,
Ministry of Economic & Defence Coordination,
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New Delhi.

3. Terms of Reference

1. The general terms of reference of the Working Group were:—

(i) To make an estimate of the requirements of equipment falling within the scope of the Working Group, having regard to the production programmes and investment in the Sectors requiring such equipment envisaged during the Fourth and Fifth Plans, in so far as they are relevant to the establishment of capacity for the manufacture of such equipment during the Fourth Plan. In making this estimate, the requirements of replacements and possibility of exports should be taken into account.

(ii) To make an analysis of these requirements, in terms of category of equipment and value.

(iii) To work out in detail the requirements of each category of equipment, by type and by range, during each of the years of the Fourth Plan.

(iv) To recommend the capacity and production targets for 1970-71, for each category of equipment, by type and by range, to the extent indigenous manufacture is considered feasible and desirable.

(v) To make an assessment of the production capacity of existing and projected manufacturing facilities and to work out the gaps for each category of equipment.

(vi) To investigate the best manner in which the gaps could be covered to the extent feasible and desirable by the end of the Fourth Plan; and to make specific proposals to this end, by way of expansion or new projects etc.

(vii) To make an estimate of the investment and foreign exchange on capital and maintenance account required for implementing the production programmes as recommended.

(viii) To make an estimate of power, fuel, transport and other requirements of a significant order.

(ix) To make an estimate of raw materials, components etc. required for the manufacture of such equipment and to suggest measures for the indigenous manufacture of such items.

(x) To recommend measures by which utilization of manufacturing capacity and programmes of production in the consuming sectors are coordinated to the fullest extent.

(xi) To make such other recommendations as may be relevant.

2. Subsequently the Ministry of Steel, Mines, and Heavy Engineering, by their letter No. MEI-9(16)/63, dated the 21st May 1964, extended the terms of reference as under:—

“Planning Commission desire that the Working Groups under the Planning Group on Machinery Industries may include the following information also in their final reports.

- (i) Based on schemes already licensed/approved till now,
 - (a) indigenous capacity/production expected to be reached by 1965-66.
 - (b) additional capacity and production expected during each year of the Fourth Plan.

For the purpose of (a) and (b) above, only schemes on which definite decisions have been taken in regard to investment and issue of import licence should be taken into account.

(ii) Capacity that has to be set up in addition to (i) (a) and (b) above to achieve the capacity and production targets recommended for 1970-71. This additional capacity may be divided into two groups:

- (a) by expansion of existing schemes;
- (b) by establishing new units both in the Public and Private sectors.

(iii) An analysis of total capacity under (i) and (ii) above with specific schemes, so far as may be possible, with reference to unit size, product mix, total investment, value of capital goods and its indigenous content, foreign exchange (capital goods) already arranged and still required.

(iv) On the basis of recommendations made, the likely total capacity/production and its value during each year of the Fourth Plan.

(v) For the production at (iv) above, the foreign exchange requirements of raw materials, spares, components etc. with their quantities during each year.

(vi) On a reasonable estimate of machinery available during each year of the Fourth Plan from indigenous sources the extent to which machinery needs to be imported in order to fulfil the production programmes of user industries.

The Group may also examine the problems that might militate against the phased achievement of the targets recommended and suggest measures for overcoming them.

It will be recalled that the Working Groups had undertaken the study of Fourth Plan programmes with reference to certain tentative targets of capacity and production furnished by the Planning Commission last year. The Planning Commission have now transmitted a revised set of tables prepared on the basis of a recent reappraisal of industrial programmes. Copies of these tables have already been forwarded to the Working Groups."

4. Meetings Held

The Group held four meetings:

1st in Calcutta on 7th and 8th November, 1963.

2nd in Calcutta on 12th February, 1964

3rd in Calcutta on 24th September, 1964.

4th in Delhi on 6th October, 1964.

The gap between the 2nd and 3rd meeting was due to the Chairman being out of India for approximately 3½ months.

5. Classification of Structural Steelwork

In order to specify various types and ranges of structurals, it was agreed to classify these by three types, *viz.*, Light, Medium and Heavy, as per details given below. (This is the basis also used for classifying structural fabricating capacity):—

(a) **Light.**—Tea Garden factories, tank stagings, roof trusses, single beam columns, building steelwork. Material is man-handled—light factory building and a few items of machinery; simple design and fabrication. This kind of steelwork covers approximately 50% of the total demand. Heaviest individual piece—3 tonnes.

(b) **Medium.**—Factory buildings, rail and road bridges up to 100 ft. span, overhead travelling cranes, wharf cranes, sluice gates, transmission towers.

Works are well equipped with overhead travelling cranes, good design and fabrication is necessary.

This type of steelwork covers approximately 35% of the total demand.

Heaviest individual piece—10 tonnes.

(c) **Heavy.**—Large factory buildings melting and bessemer shops of steel plants, large span road and rail bridges, large capacity cranes for workshops and cranes for steelworks. Works are well equipped with overhead travelling cranes and some special machinery. First class design and fabrication is necessary.

This range of steelwork covers approximately 15% of the total demand.

Heaviest individual piece—20 tonnes and even more.

6. Requirements of Capital Goods

(i) It was agreed that the requirements of capital goods machinery for Structural and Crane manufacturing industry are normally as under:—

Annual Capacity	Approximate Capital Goods equipment re- quirement (imported/ indigenous) (Rs. Lakhs)
<i>I. Structural:</i>	
6,000 tonnes	48.96
12,000	80.27
24,000	136.06
<i>II. Cranes (E.O.T. & Others):</i>	
96 Nos. (up to 10 tonnes capacity)	129.41
180 .. 10	158.79
180 .. 70	} 192.41
plus 24 .. 3 Port Cranes	

(ii) A break-up list of machinery required for Structural/ Crane manufacturing projects, as listed in appendices I to VI, was given to the convenor of Working Group VI—Machine Tools for necessary action. These lists of machinery and plant are comprehensive, and economy could be effected by utilizing modern all welded fabrication methods, and by having forging and gear cutting work sub-contracted to firms with specialized plant to undertake this work. Gear cutting capacity at present available is largely captive making it difficult to obtain regular supplies. *It is expected that nearly 40% of the machinery mentioned at I and II above will be available indigenously.* The replacement of machinery in existing works and site erection plant would amount to approximately 2 crores per annum in terms of foreign exchange. The Advisory Panel recommended at para 18 below will have to operate this foreign exchange ceiling.

7. Requirements of Electrical Power

It is estimated that the electric power requirements for Structural fabricating units and cranes manufacturing units would be as under:—

Structurals per annum	KVA	Cranes per annum	KVA
6,000 tonnes	750	96 Nos.	1,750
12,000 „	1,000	180 „	2,750
24,000 „	2,000	180 „ } plus 24 „ }	2,750

8. Requirements of Fuel, Coke, Furnace Oil, etc.

The requirements of fuel, viz., coke, furnace oil, etc. are relatively negligible for this industry.

9. Transport Requirements

(i) For the fabrication of structurals, cranes and hydraulic gates, it is estimated that approximately 15% more than the finished weight of the steelwork in sections and plates will have to be transported to the fabricating works to allow for wastage, etc.

(ii) For the transport of fabricated steelwork, there is underloading of wagons and lorries because of the bulkiness which prevents proper utilisation of the carrying capacity of the transport employed. This problem is even more acute in the case of cranes and hydraulic gates where a wagon with a carrying capacity of 40 tonnes is loaded with only 6 tonnes and rarely over 20 tonnes.

(iii) Because of these factors it is estimated that an allowance of 60% should be added to the finished weight of steel work to allow for underloading

10. Imported Components

Imported components are required mainly for cranes of all types and hydraulic gates. The percentage of components to be imported varies from 5% to 30% depending on the end use of the product. Efforts should be continued to increase the indigenous contents of these products.

11. Estimate of Demand for Structural

The estimated demand for structural by 1970-71 has been assessed as under:—

Sl. No.	Description	Annual requirement by 1970-71 (In Tonnes)
1.	Steel Plant (including plant building)	2,00,000
2.	Chemical plants (associated* structurals)	65,000
3.	Other Metallurgical industries (Aluminium, etc.)	10,000
4.	Factory buildings excluding 1 above	3,25,000
5.	Power Plants: (a) Thermal	60,000
	(b) Hydro	50,000
6.	Transmission of power	1,05,000
7.	Railways. (a) Buildings, (b) Bridges and (c) Electrification }	1,50,000
8.	Road Bridges	110,000
9.	Material Conveying:	
	(a) Conveyors	10,000
	(b) Ropeways	5,000
	(c) Cranes	65,000
10.	Irrigation	36,000
		<u>10,91,000</u>
	TOTAL	10,91,000

(ii) It was agreed that there might be some duplication in the above items, but, on the other hand, the list is by no means comprehensive. It was agreed, therefore, to assume an annual demand of (rounded figure) 1.2 million tons.

(iii) Not included in the estimated demand are large dia. fabricated steel pipes, steel doors and windows shutters, slotted angles and cold formed sections.

[*Chemical plants (including fertilizer, petroleum, refinery and petrochemical industries) are large consumers of structurals for the erection of plant and machinery. It is estimated that by 1970-71, the fixed investment in this industry will be made at a rate of approximately Rs. 2,500 million per annum. Approximately 5 per cent of this will be for associated structurals. Assuming the cost of structurals to be about Rs. 2,000 per ton, the requirements of structurals comes to approximately 65,000 tons/annum.]

12. Capacity for Fabricated Structural Steelwork

(i) Based on replies received the annual *single shift capacity* in the three regions is approximately as given below: —

Calcutta region	. . . . .	73,000 Tonnes
Bombay region	. . . . .	64,000 ..
Southern region	. . . . .	14,000 ..
		TOTAL 1,51,000 ..

(ii) A detailed statement showing capacities of individual firms is given in Appendix A. VII.

(iii) Appendix VIII gives details of the schemes already licensed and approved on the basis of (a) indigenous capacity/production expected by 1965-66; and (b) additional capacity/production expected during each year of the Fourth Plan.

(iv) The actual production in 1963 was approximately 1,80,000 tonnes.

13. Increase in Productivity and Extended Use of Broad Flange Beam.

(i) Records kept over many years show that in the Structural Fabricating Industry in India, the average output is one ton per man per month against one ton per man per week for similar work in the U.K.

(ii) There are many reasons for this wide difference in productivity, but the main ones are shortage of matching steel, shortage of electric power, non-availability of broad

flange beams, the high incidence of non-productive to productive labour, climate and nutrition.

(iii) The introduction of generous production bonus schemes has resulted in a progressive rise in productivity, but it has not been possible to correctly gauge the fullest possibilities of such schemes due to the fact that the Structural Fabricating Industry has for many years run at 50% of its installed capacity due to the shortage of matching steel. Indeed this is the greatest single limiting factor to raising output.

(iv) It is reasonable to assume that given adequate orders, with full supplies of matching steel with electrodes to provide full utilisation of installed capacity without interruption due to cuts or restrictions in the supply of electrical power, it would be possible with the introduction of a second shift together with some additional balancing capital goods and installation of extra cranes, to obtain a 50% increase in production, *i.e.*, to 1.1/2 tons per man per month.

(v) The present installed capacity in a single shift is 1,51,000 tonnes, so with a 50% increase this would rise to 2,26,000 tonnes.

(vi) A further increase in production could be attained by the extensive use of broad flange beams and automatic welding together with the addition of some specialised capital goods as oxy-plane machines, and high speed beam ending machines.

(vii) There is a strong case for setting up a suitable plant attached to one of the Steel Mills producing plates for the mass production of welded broad flange beams of the type now being manufactured in the U.S.A. and U.K. These welded broad flange beams would replace the rivetted built up plate girders which fabricators are compelled to adopt at present for such application as column shafts and gantry girders.

(viii) The cost of setting up a rolling mill for broad flange beams is very great and it is for this reason that Kaisers in the U.S.A. and Dorman Long in the U.K. have set up plants to fabricate welded alternatives as the capital cost involved is considerably cheaper.

(ix) It is felt that with the adoption of these measures in combination with standardisation in designs, there would be a further rise in productivity to 2 tons per man per month or say 3,00,000 tons per annum.

14. Gap in Capacity and Demand

There is thus an annual gap of 9,00,000 tonnes to meet the Fourth Plan target of 1,20,00,000 tonnes. If large scale imports of fabricated steel are to be avoided, it will be necessary for at least 4 public sector units to be set up, each with a capacity of 20/24,000 tonnes per annum. The gestation period is estimated to be 30 months. In addition those firms who have been given industrial manufacturing licences should be encouraged to bring their new Works into early operation.

15. Lack of Interest in the setting up of New Heavy Structural Units.

It was felt that new entrepreneurs were not being attracted to the heavy structural fabricating industry because the return on capital employed was poor in relation both to the risk involved and to the turnover. Indeed, many would be new comers felt that as the work involved was of a highly specialised nature, demanding first class design and drawing offices, and well equipped works with a high standard of supervision, the investment was somewhat speculative as the profit of margin was considered very low, being approximately 10% of the selling price.

16. Foreign Collaboration

It was generally agreed that foreign technical collaboration for the manufacture of heavy structurals, cranes and hydraulic gates should be beneficial but no general directive could be issued as each case had to be examined on its merits.

17. Need for Full Utilization of Existing Fabricating Capacity and Need for Priority.

(i) The Committee feels that to ensure the maximum utilization of the fabricating facilities available in the country, it is essential that the Government give full details of their requirements with order of priority for the expansion of the existing steel plants and the setting up of new ones together with the requirements of both rail and road bridges, power stations, heavy electrical units and other public sector projects to the Structural Fabricating Panel so that long term planning for the placing of orders, standardisation of designs and procurement of steel can be carefully co-ordinated to match the needs of these various projects. It is felt that this matter has great urgency and that firm orders should be placed through the Panel between April and June 1965, otherwise there will be no alternative to the large-scale import of fabricated steel work for these very high priority projects.

18. Panel of the Structural Fabricating Industry

In order to overcome the difficulties that stand in the way of full utilization of the installed capacity, and to ensure that the capacity is evenly booked, it is recommended that a Panel be appointed as early as possible, having representatives from fabricating firms in Calcutta, Bombay, Madras and other regions, Iron and Steel Control, Railway Board, D.G.S. & D., Ministry of Steel & Heavy Industries, Finance and Dte. General of Technical Development. The Panel should meet at least once in three months, and should cover only medium and heavy structurals, by excluding the light structurals. It is expected that nearly 20/30 firms, including the new projects recommended at (vi) above, will come within the purview of this Panel, for loading their capacity, on the basis of "negotiated engineering contracts" as was done in the case of structural requirements of Alloy Steel Plant at Durgapur and other Railway Board contracts. This Panel should also assist firms in obtaining (a) capital goods import for balancing purposes (b) co-ordination of steel priorities for projects (c) import of spares for existing machinery and (d) setting up of new units to meet the Fourth Plan target. It is also recommended that in order to correctly assess the installed capacity of each firm, zonal working boards should be established in Calcutta, Bombay and Madras. Each zonal working board should be headed by a member of the Panel of the Structural Fabricating Industry and visits should be periodically made to each of the fabricating firms so that their productive capacity could be verified every half year. This Advisory Panel should have regular allotment of foreign exchange from Ministry of Finance for distribution to various firms on whom orders are placed, so as to obviate the shortages stated at (iv) and (v) above. The allotment will be intimated to the fabricating firms, who will submit regular prescribed import applications to CCI/I&SC through Dte. General of Technical Development and these will be processed in the usual manner. It is recommended that the Secretary of this Working Group, who is familiar with the details, be included as a Member of the Panel for the Structural Fabricating Industry.

19. Need for Developing Capacity for High Tensile Unit Construction Bridges, Ore and Material Handling Plant.

The demand for medium and heavy steelwork will be very great over the next four/five years, and it is felt that because of this the small number of firms who have the specialized design and fabricating facilities, should not be called upon to defer their capacity to lighter steelwork, such as is required for high tensile unit construction bridges, ore-handling and

other material handling equipment, for which additional capacity should be created.

20. Site Fabrication

For the fabrication of steelwork for medium-heavy factory buildings, considerable economy in freight and time can be effected by site fabrication. This method necessitates the setting up of a small fabricating unit complete with cranes at site where all raw materials are delivered. The materials are straightened, cropped/sawn/or guillotined to size and assembled in a jig for welding. All connections for the columns, roof trusses and girders are drilled for bolted connections.

21. Fasteners

It is felt that with the very great demand for fabricated steelwork which is likely to be required by 1970-71, it is essential that immediate steps are taken for the setting up of additional capacity for the manufacture of Mild Steel bolts, nuts and rivets, also of high tensile bolts and rivets, as even present capacity is inadequate, to meet the evergrowing demand. The demand for welding wire for automatic welding is rapidly rising, and adequate supplies must be made available from indigenous resources. A copy of the Minutes of Sub-Group 'C'—Planning Group on Light Engineering Industries—Fourth Plan, of the meeting held on 26-11-1963 and 27-11-1963 was handed over to the members present.

22. Electric Overhead Travelling Cranes, for Workshop Duty, Chain Pulley Blocks, Electric Hoists and other Material Handling Equipment.

(i) To ensure standardization, it is essential that the I.S.I. specification for Electric Overhead Travelling Cranes, and Wharf Cranes, should be finalised and issued at an early date. A portion of the specification for electric overhead travelling cranes has been drawn up; but it is not yet complete, and the I.S.I. must accelerate finalization.

(ii) There is a very great shortage of steel castings and forgings for crane manufacture, and additional capacity has to be quickly set up to meet the growing demand. The indigenous manufacture of control gear for Electric Overhead Travelling Cranes and Wharf Cranes is very limited, and at least two electrical manufacturers should be encouraged to set up capacity for the manufacture in India, of protective panels, controllers, resistances, solenoids, thrustors and limit switches.

(iii) Although a large number of firms have or are being licensed for the manufacture of cranes, pulley blocks, electric hoists and other material handling equipment, no real progress has been made to implement their plans. It is recommended that unless positive steps are taken to bring these units into production within a period of 15 months from date, suitable steps should be taken to revoke their licences and create real capacity afresh. The Working Group is of the opinion that it would be uneconomical to set up a separate works for the manufacture of cranes, as the structural fabricating capacity which would form an integral portion, would not be fully utilised.

23. Steelwork, Duty Cranes

(i) There is at present inadequate capacity for the design and manufacture of steelwork duty cranes such as strippers, chargers, ladles, and it is recommended that those firms licensed together with the Heavy Engineering Corporation at Ranchi be instructed to accelerate their manufacturing programmes for this type of equipment.

(ii) The electrical equipment consisting of motors, switch-gear and controllers are of a very specialised nature and it is recommended that these be progressively manufactured by the Heavy Electric Corporation at Ranchi.

24. Mobile Cranes

Although there is a very large unsatisfied demand for mobile cranes, only two manufacturers have so far marketed their product. It is recommended that at least three other firms should be encouraged to produce mobile cranes.

25. Hydraulic Gates

To ensure the maximum utilization of resources available for the manufacture of Hydraulic Gates, it is recommended that standardization should be insisted upon, as this would enable existing drawings to be utilized to the maximum extent. The width between piers and depth should be standardized. Economy in steel can also be effected by the elimination of counter-balance weights.

26. Need for Structural Designers and Draughtsmen

It is recommended that specialised courses be introduced in the Universities and Polytechnics for Structural Design and Draughtsmanship.

27. Need for Training Additional Skilled Workmen

It is also recommended that in-plant training for skilled workmen should be further augmented by every medium and heavy structural fabricating workshop, so that the substantial expansion of existing units and the new works to be set up in the future are properly manned for fuller utilization of the installed capacity.

APPENDIX I

Capital cost of produce 6000/12000/24000 tons structural Steel work per annum

Machine	Capacity	Cost, each (Rs.)	6000 Tons output		12000 tons output		24000 tons output	
			No. of M/C	Total Cost Rs.	No. of M/C	Total Cost Rs.	No. of M/C	Total Cost Rs.
Guillotine	10'-0" × 1"	1,50,000	1	1,50,000	1	1,50,000	2	3,00,000
Do.	8'-0" × 3/4"	1,00,000	×	...	1	1,00,000	2	2,00,000
Do.	8'-0" × 1/2"	65,000	2	1,30,000	2	1,30,000	4	2,60,000
Plate Levelling Rolls	9'-0" × 1.1/4"	6,00,000	1	6,00,000	1	6,00,000	2	12,00,000
Do.	6'-0" × 1/2"	1,50,000	1	1,50,000	1	1,50,000	2	3,00,000
Plate Bending Rolls	8'-0" × 3/4"	1,50,000	1	1,50,000	1	1,50,000	2	3,00,000
Double-ended Beam Straight	18' × 6" Beam	1,00,000	1	1,00,000	2	2,00,000	3	3,00,000
Angle Straightening Rolls	31' × 3 1/2" × 3/8"	1,25,000	1	1,25,000	1	1,25,000	2	2,50,000
Hydraulic Cold Saw	32" dia Blade	50,000	1	50,000	3	1,50,000	6	3,00,000
Punch/Cropper	5" × 5" × 3/4"	60,000	1	60,000	2	1,20,000	4	2,40,000
Plate Edge Planner	30'-0" × 2"	1,30,000	1	1,30,000	1	1,30,000	2	2,60,000
Do.	36'-0" × 1.1/2"	1,50,000	1	1,50,000	×	...	1	1,50,000

PRODUCCIÓN MACHINES:

APPENDIX I—Contd.

Machine	Capacity	Cost, each (Rs.)	6000 Tons output		12000 tons output		24000 tons output	
			No. of M/C	Total Cost Rs.	No. of M/C	Total Cost Rs.	No. of M/C	Total Cost Rs.
Plate Edge Planner	54'-0" × 1.1/2"	1,70,000	×	..	1	1,70,000	1	1,70,000
Press Brake	400 T × 16'-0"	3,00,000	×	..	1	3,00,000	1	3,00,000
Radia Drills (Girder type)	6'-0" arm	22,000	20	4,40,000	40	8,80,000	80	17,60,000
Radia Drills (Universal)	6'-0" arm	45,000	1	45,000	2	90,000	4	1,80,000
Radia Drills (Portable)	6'-0" arm	26,000	2	52,000	4	1,04,000	8	2,08,000
Hydraulic Press	400 tons	55,000	1	55,000	1	55,000	1	55,000
Do.	200 tons	45,000	×	..	1	45,000	1	45,000
High speed Beam end facing M/C	12'-0" × 6'-0"	1,75,000	1	1,75,000	2	3,50,000	3	5,25,000
Double Ended Grinding M/C	36" dia.	10,000	1	10,000	2	20,000	4	40,000
BURNING & WELDING EQUIP:								
Plate Slitters	1.1/4" Plate	55,000	1	55,000	2	1,10,000	4	2,20,000
Profile Cutters	36"	10,000	1	10,000	1	10,000	2	20,000
Line Cutters		3,000	1	3,000	2	6,000	4	12,000
Portable Cutters		500	3	1,500	4	2,000	8	4,000
Dual-head Gantry type Auto Welding M/C	1000 amps	2,00,000	1	2,00,000	2	4,00,000	3	6,00,000

Tractor type Welding M/C	600 amps	25,000	1	25,000	2	50,000	4	1,80,000
Semi-Auto Welding M/cs.	600 amps	10,000	2	20,000	4	40,000	8	80,000
Welding Generators	300 amp. D.C.	9,000	5	45,000	10	90,000	20	1,80,000
Welding Transformers	300/400 Amp. A.C.	3,000	15	45,000	30	90,000	60	1,80,000
Flux Recovery Units		8,000	2	16,000	4	32,000	6	48,000
Flux Vacuum Collectors		5,000	4	20,000	8	40,000	15	75,000

RIVETTING:

De. Bergue Rivetting M/cs.	1" Rivet	8,000	2	16,000	4	32,000	8	64,000
Pneu. Hand Rivetting/Chipping Grinding M/cs.		3,000	5	15,000	10	30,000	20	60,000

CONVEYING & INSPECTION:

Transfer + Service Trolleys		2,500 (Av.)	..	1,25,000	..	2,50,000	..	5,00,000
Roller Conveyors . . . . .		..	..	75,000	..	1,25,000	..	2,00,000
Jigs, Trestles etc. . . . .		..	..	1,00,000	..	2,00,000	..	4,00,000
X-Ray and Ultrasonic . . . . .		..	..	1,00,000	..	1,00,000	..	1,00,000

MAINTENANCE:

Lathe	8" Swing	6,500	2	13,000	2	13,000	4	26,000
Do.	12" Swing	8,000	2	16,000	4	32,000	8	64,000

APPENDIX I—Contd.

Machine	Capacity	Cost, each (Rs.)	6000 Tons output		12000 tons output		24000 tons output		
			No. of Total M/C Cost Rs.	Total Cost Rs.	No. of Total M/C Cost Rs.	Total Cost Rs.	No. of Total M/C Cost Rs.	Total Cost Rs.	
Shaping M/C	24"	7,000	1	7,000	2	14,000	2	14,000	
Planer	8'-0" × 4'-0"	30,000	1	30,000	1	30,000	2	60,000	
Guillotine Blade Grinders	4000 mm.	35,000	1	35,000	1	35,000	1	35,000	
Saw Blade Grinder		20,000	1	20,000	1	20,000	1	20,000	
Tool and Cutter Grinder		20,000	1	20,000	1	20,000	1	20,000	
Drill Grinder	2"	12,000	1	12,000	1	12,000	1	12,000	
Slotting M/C	14/18"	3,000	1	8,000	1	8,000	1	8,000	
Pillar Drill	1"	5,000	1	5,000	1	5,000	2	10,000	
Power Hack Saw	6"	1,000	1	4,000	1	4,000	2	8,000	
Milling Machine	Medium	30,000	..	..	1	30,000	1	30,000
Blacksmith Heart	..	5,000	1	5,000	2	10,000	3	15,000	
Screwing Machine	4" pipe	20,000	1	20,000	1	20,000	1	20,000	
SERVICES:									
Electric Power (incl. transformer and L.T. distribution).			750	2,50,000	1000	4,00,000	2000	5,50,000	
Lighting			KVA	1,00,000	KVA	1,50,000	KVA	2,00,000	
Compressed Air		45,000	3	1,35,000	5	2,25,000	9	4,05,000	

Water tubewell and tank	.	.	.	6" tubewell	93,000	93,000	93,000
Weighbridge	.	.	.	50 ton	1	50,000	1 50,000
Shunting Loco	.	.	.		1	50,000	2 1,00,000
Cranes—E.O.T.	.	.	.	5 ton	2	1,90,000	4 3,80,000
Do.	.	.	.	10 ton	2	2,40,000	4 4,80,000
Do.	.	.	.	15 ton	..	..	4 5,20,000
Cranes—Portable	.	.	.	12 ton	1	1,50,000	2 3,00,000
						48,96,500	1,36,06,000
BUILDINGS:							
Land	.	.	.	50 acres		1,90,600	1,00,000
						@ Rs.2000 per acre (Nominal)	
Site Preparation (incl. roads, tracks, fences).	.	.	.			10,00,000	10,00,000
Main factory building	.	.	.			27,00,000	40,00,000
Latrines/Septic tanks	.	.	.			50,000	50,000
						87,46,500	1,31,77,000
						GRAND TOTAL	2,08,06,000

NOT INCLUDED:

Administration Building.	.	.	.
Canteen	.	.	.
Millwright Shed	.	.	.
Railway Siding	.	.	.
Lorries etc.,	.	.	.
Plant installation and commissioning	.	.	.

APPENDIX II

Summary of capital costs for crane production

Particulars	Annual Output		
	100 Nos. 10 Ton E.O.T. Cranes (Rs.)	180 Nos. up to 40 Ton E.O.T. Cranes (Rs.)	189 Nos. up to 70 Ton E.O.T. Cranes plus 24 Nos. 3 ton Wharf Cranes (Rs.)
BROUGHT FORWARD FROM ATTACHMENTS:			
(A) Smithy and Forge	7,56,000	7,56,000	20,80,000
(B) Foundry	14,13,000	16,98,000	18,19,000
(C) Production Machinery including Toolroom General etc.	66,29,000	92,82,000	1,11,99,000
(D) Structural (Generally for 500 Tons)	41,43,600	41,43,600	41,43,600
(E) Buildings	15,00,000	17,50,000	20,00,000
(F) Land (Say 25 Acres) (Nominal Price)	50,000	50,000	50,000
TOTAL	1,41,91,600	1,76,79,600	2,12,91,600
NOT INCLUDED (A, B, C & D):			
Administrative Block		1,58,79,600	1,92,41,600
Canteens			
Sidings			
Lorries			
Latrine and Water			

APPENDIX III

Electric overhead travelling cranes

STRUCTURAL PLANT AND EQUIPMENT TO PRODUCE

180 Nos. E.O.T. Cranes up to 70 tons capacity
plus 24 Nos. 3 ton Level Luffing Wharf Cranes

Machine	Capacity	Quantity requir- ed	Cost (Rs.)
Guillotine . . .	6'-0" × 1"	1	1,20,000.00
Guillotine . . .	7'-0" × 3/4"	1	1,00,000.00
Guillotine . . .	8'-0" × 1/2"	1	65,000.00
Mangle Rolls . . .	9'-0" × 1"	1	5,00,000.00
Mangle Rolls . . .	6'-0" × 1/2"	1	1,50,000.00
Beam Straight . . .	18" Beam	1	1,00,000.00
Angle St. Rolls . . .	3 1/2" × 3 1/2" × 3/8"	1	1,25,000.00
Plate Ed. Pl. . . .	30'-0" × 2"	2	1,30,000.00
Cold Saws	24" × 7 1/2" Beam	2	1,00,000.00
Cold Saw	12" × 6" Beam	1	50,000.00
Punch and Cropper . . .	5" × 5" × 3/8" Angle	2	1,20,00.00
Rad. Drills	1.3/4" Hole	20	4,40,000.00
Hyd. Riv. Mach.	1" Rivet	2	16,000.00
Rotary End Mach.	3'-0" × 10'-0"	1	1,75,000.00
Air Compressor	1500 CFM	3	1,35,000.00
Auto Weld. Mach.	SAE 900	1	2,00,000.00
Man Weld. Mach.	SAE 300	20	90,000.00
Flux Recov. Unit		2	16,000.00
Grind Mach. Stat		2	10,000.00
Planing Mach.	8'-0" × 4'-0"	1	30,000.00
Hyd. Presses	200 ton	2	1,00,000.00
Transformer & Distribution	750 KVA	1	2,50,000.00

Machine	Capacity	Quantity required	Cost (Rs.)
Shaping Mach.	3'-0" Travel	2	16,000.00
Lathes	8½" × 8'-0"	2	18,000.00
Screwing Mach.	4" Pipe	1	17,000.00
Smithy Blower		1	600.00
Hydraulic Pump		1	80,000.00
E.O.T. Cranes	15 ton	2	2,60,000.00
E.O.T. Cranes	10 ton	2	2,40,000.00
Portal Crane	15 ton	1	1,50,000.00
E.O.T. Cranes	5 ton	1	1,90,000.00
Drill Grind Mach.	2" Drills	1	12,000.00
Saw Sharp Mach.	38" disc.	1	20,000.00
Paint Mix. Mach.		1	3,000.00
Profile Gas Cutter	36"	1	10,000.00
Oxy Line Cutter		1	3,000.00
Oxy Acety		4 sets	2,000.00
Diesel Loco	50 ton	1	50,000.00
Weigh Bridge	50 ton	1	50,000.00
TOTAL			41,43,600.00

APPENDIX IV

Electric Overhead Travelling Cranes

FORGING SHOP PLANT REQUIREMENTS TO PRODUCE

100 Nos. E.O.T. Cranes up to 10 tons capacity

180 Nos. E.O.T. Cranes up to 40 tons capacity

Quantity	Particulars	Cost Each (Rs.)	Total (Rs.)	Remarks
1	2 ton single leg hammer fitted with.	3,60,000	3,60,000	
2	1 ton Hydraulic Charging and Manipulating cranes one on each side.	10,000	20,000	
3	Oil Furnaces (Single Chamber)	8,000	24,000	
1	7 Cwts. Massey or similar type hammers.	97,000	97,000	
1	Oil Fired Furnaces (Single Chamber Small).	6,000	6,000	
1	Heat Treatment Furnace (Oil fired).	8,000	8,000	
1	Quenching Tank (Oil)	1,000	1,000	
1	High Speed Cold Saw (38" Blade).	50,000	50,000	
2	5 ton E.O.T. Cranes	95,000	1,90,000	
	TOTAL		7,56,000	

APPENDIX V

Electric Overhead Travelling Cranes

FORGING SHOP PLANT REQUIREMENTS TO PRODUCE

180 Nos. E.O.T. Cranes up to 70 tons capacity,
plus 2-3 ton Level Luffing Wharf Cranes

Quantity	Particulars	Cost each (Rs.)	Total (Rs.)	Remarks
1	3 ton Arch type hammer fitted with.	5,00,000	5,00,000	
2	2 ton Hydraulic charging and Manipulating Cranes one each side.	10,000	20,000	
2	Oil fired furnaces (preheating and high temperature) (Double chambered).	8,000	16,000	
2	2 ton single leg hammer fitted with.	3,60,000	7,20,000	
2	1 ton hydraulic charging and manipulating cranes one on each side.	10,000	20,000	
4	Oil Furnaces (Single chamber)	8,000	32,000	
3	7 cwts. massey or similar type hammers.	97,000	2,91,000	
2	Oil Fired Furnaces (Single chamber small).	6,000	12,000	
1	Heat Treatment Furnace (oil fired).	8,000	8,000	
1	Quenching Tank (oil)	1,000	1,000	
3	High Speed Cold Saws (38" Blades).	50,000	1,50,000	
2	5 ton E.O.T. Cranes	95,000	1,90,000	
1	10 ton E.O.T. Cranes	1,20,000	1,20,000	
GRAND TOTAL			20,80,000	

APPENDIX VI

Electric Overhead Travelling Cranes

MACHINERY AND PLANT REQUIREMENTS

Type of Machine'	Description of Machine	To manufacture up to 100 Nos. 10 Ton E.O.T. Cranes			To manufacture 180 Nos. E.O.T. Cranes up to 40 tons Cap.			To manufacture 180 Nos. E.O.T. Cranes up to 70 Tons + 23-3T Level Luff Cranes		
		No. of m/c.	Cost (Rs.)	No. of m/c.	Cost (Rs.)	No. of m/c.	Cost (Rs.)	No. of m/c.	Cost (Rs.)	
	2	3	4	5	6	7	8	9	10	
1	2									
Cut off M/c.	2	14,000	2	14,000	2	14,000	2	14,000	
Centering M/c.	1	65,000	1	65,000	1	65,000	1	65,000	
Bar Straightening M/c.	1	16,000	1	16,000	1	16,000	1	16,000	
Lathe (Light)	2	1,20,000	3	1,80,000	3	1,80,000	3	1,80,000	
Lathe (Medium)	2	2,30,000	3	3,45,000	3	3,45,000	3	3,45,000	
Lathe (Heavy)		2	2,60,000	2	2,60,000	2	2,60,000	
Lathe (Shafting)	1	1,30,000	1	1,30,000	1	1,30,000	1	1,30,000	

1	2	3	4	5	6	7	8
			Rs.	Rs.	Rs.	Rs.	Rs.
Capstan (Small)	1" capacity Bar	2	1,00,000	2	1,00,000	2	1,00,000
Capstan (Medium)	1.1/2" Capacity Bar	2	1,44,000	3	2,16,000	3	2,16,000
Turret Lathe (Medium)	Chucking 12" Capacity	4	2,88,000	5	3,60,000	5	3,60,000
Turret Lathe (Heavy)	Chucking 18" Capacity	..	..	1	1,02,000	2	2,04,000
Lathe (Copying Hyd.)	G/F Approx: 8 x 12' x 6" dia	1	1,80,000	2	3,60,000	2	3,60,000
Vertical Boring Mill (Small)	36" Chuck Webster & Bennett	2	2,70,000	3	4,05,000	3	4,05,000
Do. (Medium)	48" Chuck Webster & Bennett	2	3,30,000	2	3,30,000	2	3,30,000
Do. (Large)	72" Chuck Webster & Bennett	..	..	—	..	2	4,20,000
Horizontal Boring Mill (Small)	3' Sq. Table x 3" Spindle	1	90,000	1	90,000	1	90,000
Do. (Medium)	5' Sq. Table x 4.1/2" Spindle	3	6,75,000	3	6,75,000	3	6,75,000
Do. (Large)	Floor type x 4.1/2" Spindle x 30" travel	1	3,50,000	1	3,50,000	2	7,00,000
Plane Mill or Grinder	4 Head x 5' x 5' x 12'-0"	1	4,50,000	1	4,50,000	1	4,50,000
Planning M/c. (Small)	4 Head x 3' x 3' x 10'-0"	1	2,00,000	1	2,00,000	1	2,00,000
Do. (Medium)	4 Head x 5' x 5' x 16'-0"	1	3,50,000	1	3,50,000	1	3,50,000
Do. (Large)	4 Head x 8' x 6" x 25'-0"	..	..	1	5,00,000	1	5,00,000
Shaping Machine	24" Stroke Butler	1	10,000	1	10,000	1	10,000
Horizontal Milling M/c.	Universal Type 42/48 Table	1	52,000	2	1,04,000	2	1,04,000

Vertical Milling M/c.	1	52,000	2	1,04,000	2	1,04,000
Universal Type 42/48 Table						
Keyseating Machine	1	30,000	1	30,000	1	30,000
1 1/4" x 15" Stroke						
Slotting M/c. (Medium)	1	40,000	1	40,000	1	40,000
12" Stroke						
Slotting M/c. (Large)	1	1,02,000	1	1,02,000	1	1,02,000
24"						
Drill M/c. (Sensitive)	2	10,000	2	10,000	2	10,000
Up to 1" Capacity						
Drill M/c. (Radial)	3	54,000	4	72,000	4	72,000
6'-0" Rad. x 2.1/2" capacity						
Cyl. Grinding M/c. (Med.)	1	40,000	1	40,000	1	40,000
12" Swing x 5'-0" Centres						
Cyl. Grinding M/c. (Large)	1	90,000	1	90,000	1	90,000
18" Swing x 8/8'-0"						
Gear Cutting M/c. (Small)	1	55,000	1	55,000	1	55,000
Up to 24" dia x 4 DP Max.						
Gear Cutting M/c. (Medium)	2	2,90,000	3	4,35,000	3	4,35,000
Up to 3'-6" dia x 2 DP Max.						
Gear Cutting M/c. (Large)	..	..	..	..	1	8,00,000
Up to 6'-0" dia x 1 DP Max.						
Klingelnberg Universal Gear Checking M/c. No. PZ.375	1	30,000	1	30,000	2	60,000
5 Ton E.O.T. Crane	2	1,90,000	2	1,90,000	2	2,85,000
10 Ton E.O.T. Crane	..	..	2	2,40,000	2	2,40,000
FOR TOOL ROOM:						
Heat Treatment Plant	1	75,000	1	1,00,000	1	1,00,000
Complete for casehardening, hardening, tempering, annealing						
Sand Blasting Plant	1	10,000	1	10,000	1	10,000
2'-0" x 2'-0" Cabinet						

	1	2	3	4	5	6	7	8
Hardness Testing M/c.	.	.	1	10,000	1	10,000	1	10,000
Vertical Milling M/c.	.	.	1	52,000	2	1,04,000	2	1,04,000
Cent. Lathes	.	.	2	1,20,000	2	1,20,000	2	1,20,000
Horizontal Milling M/c.	.	.	1	60,000	2	1,20,000	2	1,20,000
Shaping M/c. Big Size	.	.	1	10,000	1	10,000	1	10,000
Do-all Contourmatic Saw	.	.	1	10,000	1	10,000	1	10,000
20/30T Press	.	.	1	15,000	1	15,000	1	15,000
Tool and Cutter Grinder	.	.	2	36,000	3	54,000	3	54,000
Surface Grinder	.	.	1	30,000	1	30,000	1	30,000
Lumsden Tool Grinder	.	.	1	20,000	1	20,000	1	20,000
Rowlands Tool Grinder	.	.	1	20,000	1	20,000	1	20,000
Drill Grinder	.	.	1	15,000	1	15,000	1	15,000
Off Hand Tool Grinder	.	.	2	14,000	2	14,000	2	14,000
Engraving Machine	.	.	1	15,000	1	15,000	1	15,000
2 Ton E.O.T. Crane	.	.	1	60,000	1	60,000	1	60,000

GENERAL:							
Air Compressors 350 c.f.m. with piping etc.	..	2	1,00,000	3	1,50,000	3	1,50,000
Transformer 1000 KVA with Switchgear, Cables etc.	..	1	3,45,000	2	5,50,000	2	5,50,000
Smiths Hearth 4'-0" x 4'-0"	..	1	1,000	1	1,000	1	1,000
FOR FITTING SHOP:							
Guillotine	..	1-3/8" x 6'-0"	64,000	1-3/4" x 6'-0"	64,000	1-1" x 6'-0"	64,000
Combined Punch and Cropper Machine to crop Angles up to 4" x 4"	..	1	60,000	1	60,000	1	60,000
Nibbling Machine 36" throat x 1/8 Capacity	..	1	10,000	1	10,000	1	10,000
Hydraulic Straightening Press Mills Type 50 Tons	..	1	20,000	1	20,000	1	20,000
Cold Saw Machine 32" Blade	..	1	50,000	1	50,000	1	50,000
Hydraulic Shafing Press 60 Tons	..	1	30,000	1	30,000	1	30,000
Electric Tyre Heater Small 60 KVA	..	1	40,000	1	40,000	1	40,000
Electric Tyre Heater Big 90 KVA	..	1	50,000	1	50,000	1	50,000
Sensitive Drill 3/4" Capacity Bench Type	..	2	5,000	2	5,000	2	5,000
Do-all Contourmatic Saw Type 16/3	..	1	10,000	1	10,000	1	10,000
Double Headed Off Hand Grinder 20" dia	..	2	14,000	2	14,000	2	14,000
Profile Oxy-Acetylene Gas Cutting Plant 48" arm	..	1	15,000	1	15,000	1	15,000
Transformer Welding Plant 300 Amps. Capacity	..	2	6,000	2	6,000	2	6,000
5 Ton E.O.T. Crane	..	2	1,90,000	2	2,40,000	3	3,60,000
TOTAL			66,29,000		90,92,000		1,10,09,000

APPENDIX VI
Manufacturer of Electric Overhead Travelling Cranes
FOUNDRY EQUIPMENTS

Description	Requirements to manufacture 8 E.O.T. Cranes up to 10 tons capacity.	Requirements to manufacture 15 E.O.T. Cranes up to 40 tons Capacity	Requirements to manufacture 15 E.O.T. Cranes up to 70 tons capacity plus 2-3 ton level L.M.F. Cranes.
Average weight of casting for one Crane	2.25 tons	6 tons	10 ton
Total weight (approximately)	18.9 tons	72 tons	31 tons
Total melt (approximate)	30 tons	Say 110 tons	LL 60 plus 62 tons = 122 tons. Say 190 tons.

	No. M/cs. Off	Cost (Rs.)	No. M/cs. Off	Cost (Rs.)	No. M/cs. Off	Cost (Rs.)
Cupola complete with Blowers, motors, Starters etc.	1-36" I/D	25,000	1-42" I/D 1-36" I/D	40,000 35,000	1-50" I/D 3-6" I/D	50,000 25,000
Drying Ovens (Floor area approx: 900'-0")	1-for Moulds 1-for Cores	1,60,000	1-for mds. 1-for cores	1,60,000	1-Big 2 Chambers for Mds. 1-for cores.	1,60,000
Sand Conditioning Plant-5 Tons/R. Hr.	1	6,00,000	1	6,60,000	1	6,00,000
Shake Out Machine-36" x 48" Table size	1	10,000	1	10,000	1	10,000
Moulding M/cs. Jolt, Squeeze, Turnover for 2'-0" x 1'-6" & 2'-6" x 2'-0" M. Boxes.	1 small 1 big.	15,000 20,000	1 small 1 big.	15,000 20,000	2 small 1 big.	30,000 20,000
Sand Slinger Rad. of arm 9'-0", max. ht. 7'-0" approx.	1	65,000	1	65,000	1	65,000

IRON FOUNDRY:

Hydroblast Machine Shot Blast	1	50,000	1	50,000	50,000
Pedestal Grinding Machines Double Ended 20" dia. whl.	3	14,000	3	21,000	21,000
Drilling Machine Radial+ Drill 2" Cap:	1	18,000	1	18,000	18,000
Hacksaw M/c. 16" Blade 10' x 10" Capacity	2	2,500	2	5,000	5,000
Swing Frame Grinder 12" x 2" Wheel	1	3,000	1	3,000	3,000
Compressor 350 Cu. ft. with piping	1	50,000	1	50,000	50,000
Hand Grinder (Pneu) 6" dia. Wheel-same as ing. Rand 2-G-60	2	1,000	2	1,000	1,000
Pug Mill 6'-0" dia. Pan	1 medium 1 small	12,000 8,000	1 big. 1 small	16,000 8,000	16,000 8,000
Oil Sand Muller 4'-0" dia. Pan	1	50,000	1	50,000	50,000
002 Sand Mixer 4 Cwt. Capacity	1	5,000	1	5,000	5,000
Small Core Oven Containous Type	1	60,000	1	60,000	60,000
Rumbler about 30 Cu. ft. volume	1		1	20,000	20,000
Guillotine M/c. Pels Type 1/2 Capacity	1	30,000	1	30,000	30,000
M/c. for making Straw Ropes	1	2,500	1	2,500	2,500
Pneumatic Rammers Bench and Floor Type	1 floor 1 bench	1,000 1,000	2 floor 4 bench	1,000 2,000	1,500 3,000
Pneumatic Chisel st. size (same as ing. rands 200R)	2	1,000	3	1,500	1,500

	1	2	3	4	5	6	7
Lathe 6' x 6'-0"	.	.	7,000	7,000	7,000	1	7,000
Weighing Machine 1-5 Cwt. 1-1 ton, 1-5 ton.	1 small, 1 big, 1 medium	1 small, 1 big, 1 medium	10,000	1 small, 1 big, 1 medium	10,000	1 small, 1 big, 1 medium	10,000
Annealing Furnace for small castings 800° C max. Temp.	1	1	8,000	8,000	8,000	1	8,000
PATTERN SHOP:							
Lathe Wood Working-3-0" between crs.	.	1	3,000	3,000	3,000	1	3,000
Land Saw Wadkin Type	.	1	3,000	3,000	3,000	1	3,000
Planner .. ..	.	1	5,000	5,000	5,000	1	5,000
Drilling M/c. Sensitive Pillar Drill ½" dia. chucking capacity.	1	1,500	1,500	1,500	1,500	1	1,500
Router Wadkin Type	.	1	30,000	30,000	30,000	1	30,000
NON-FERROUS:							
Morgan's Tilting Furnace 2½ to 3 cwt. capacity	.	1	6,500	6,500	6,500	1	6,500
Hearth with Blower	.	1	1,000	1,000	1,000	1	1,000
Small Moulding Machine for 1'-6" x 1'-0" Mould Box.	1	9,000	9,000	9,000	9,000	1	9,000

LABORATORY:

	<i>Physical</i>			
Machine for Tensile + Transverse Testing	1	75,000	1	75,000
Sand Testing Equipment for Permeability, Impact and Compression test.	1 set		1 set	
Rapid Moisture Determinator	1		1	
<i>Chemical</i>				
Balance (Chem.)	1	70,000	1	70,000
Balance (Rough)	1		1	
Distilling Set 2 Gals. per hr. approx.	1		1	
Muffle Furnace 6" x 6" x 12' Chamber; Max. Temp. 1000° C. Heaters	2		2	
Carbon and Sumpkor Determinator	1		1	
5 Ton E.O.T. Cranes	1	95,000	2	1,90,000
			3	2,85,000
GRAND TOTAL		14,13,000	16,98,000	18,19,500

APPENDIX VII

Structural Steel Fabrication

ANNUAL CAPACITY ON SINGLE SHIFT BASIS

Summary

	Annual output Tonnes
Calcutta Zone	73,000
Bombay Zone	64,000
Southern Zone	14,000
	<u>1,51,000</u>

Calcutta Zone

Firm	Annual out-put Tonnes	Heaviest Piece hand- ed Tonnes	Category		
			Light A	Medium B	Heavy C
Braithwaite and Co. (India) Ltd.	12,000	35	@	@	@
Jessop and Co. Ltd.	12,000	37	@	@	@
Burn and Co. Ltd.	8,000	46	@	@	@
Braithwaite, Burn and Jessop Const. Co. Ltd.	4,500	60	@	@	@
Martin Burn and Co. Ltd.	2,000		@	@	
Bridge and Roof Co. (India) Ltd.	9,600		@	@	@
Britannia Building and Iron Co. Ltd.	4,000		@	@	
Hindustan Motors Ltd.	5,000		@	@	
A & J Main and Co. Ltd.	3,600		@	@	
Hindustan Development Corporation	2,500	10	@	@	
Modern India Construction	2,000	10	@		
Port Engineering Works Ltd.	1,500		@		
Kumardhubi Engineering Works Ltd.	5,000		@	@	@
Bengal Fabricators (P) Ltd.	1,200		@		
		72,900			
		(Say 73,000)			

APPENDIX VII—*contd.*

Bombay Zone

Firm	Annual out-put Tonnes	Heaviest Piece handled Tonnes	Category		
			Light	Medium	Heavy
			A	B	C
Richardson and Cruddas	12,000	20	@	@	@
Structural Engg. Works	3,000	10	@	@	
Garlick and Co. (P) Ltd.	4,200	12	@	@	
Alcock Ashdown and Co. Ltd.	7,200	20	@	@	@
New Standard Engg. Co. Ltd.	7,200	10	@	@	
Kamani Brothers (P) Ltd.	6,000	10	@	@	
The Hindustan Construction Co. Ltd.	3,000		@	@	
Khandelwal Udyog Ltd.	3,000	6	@		
B.R. Herman and Mohatta (P) Ltd.	6,000	5	@		
Testeels Ltd.	4,800	4	@		
National Engg. Works.	3,000	10	@		
Steel Structures (P) Ltd.	800	10	@		
K.T. Steel Industries	3,000	6	@		
Indus. Engg. Co.	600	4	@		
	63,800				
	(Say 64,000)				

Southern Zone

Firm	Annual out-put Tonnes	Heaviest Piece handled Tonnes	Category		
			Light A	Medium B	Heavy C
Harrison and Crosfield Ltd..	5,000		@	@	
Binney's Engg. Works (P) Ltd.	2,400		@		
Southern Structurals Ltd. (assumed)	2,000		@		
Richardson and Cruddas Ltd.	4,200	10	@	@	
	13,600				
	(Say 14,000)				

APPENDIX VIII
D.G.T. (HME Dte.)

Position of Steel structurals/Crane Industry as on 1-9-1964

Item	Unit	Licensed and in production				Licensed but not in production		Total licensed capacity	Further recommended but not yet licensed		Total No. of capacity sponsored firms	Remarks	
		No. of firms	Capacity licensed	Production in 1963	Production in 1963	No. of firms	Capacity		No. of firms	Capacity			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. cranes (E.O.T., Dock Hand operated, Portable, etc.)	Tons		20	17,262	672 Nos. (5500 Tons Est.)	33	30,590	(5&8) 47,852	22	23,850	(4, 7&10) 75	71,702	
2. Transmission Towers	Do.		15	46,960	32,331	10	54,800	1,01,760	..	..	25	1,01,760	
3. Maststock	Do.		4	24,000	N.A.	1	3,000	27,000	..	..	5	27,000	
4. Hoists, Gearing and Hydraulic structures.	Do.		6	13,040	N.A.	2	4,300	17,340	1	2,000	9	19,340	
5. Light and Md. Structural.	Do.		11	2,66,624	75,145	22	67,805	3,34,429	7	6,010	142	3,40,439	
6. Tubular Structural and Pipe Manipulation.	Do.		3	5,400	N.A.	2	3,600	9,000	4	8,880	9	17,880	
7. Large dia. fabricated pipes including spiral/helical weld.	Do.		5	71,400	N.A.	..	..	71,400	..	..	5	71,400	
8. Heavy Structural	Do.		18	1,18,320	64,550	16	1,04,300	2,22,620	18	1,05,900	52	3,28,520	
9. Steel Doors, Windows and Rolling shutters.	Do.		10	9,623	N.A.	1	936	10,559	..	..	11	10,559	
10. Slotted Angles and Cold formed Sections.	Do.		2	2,400	N.A.	4	53,400	55,800	1	(to be fixed)	7	55,800	
11. Electric/Air Hoists	Nos.		4	4,308	N.A.	11	12,400	16,708	9	6,670	24	23,378	
12. Chain Pulley Blocks of all capacities.	Nos.		5	3,860	N.A.	3	7,000	10,860	3	1,060	11	11,920	
13. Winches	Tons		4	93	N.A.	1	To assess after 1 year.	93	3	480	8	573	

N.A. indicates "Not Available"

MGHPCBE-S1--JM of I&S/65--11-11-65--500.



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