

Heavy Casting of Grey Cast Iron

PRODUCT CODE	: 33161700
QUALITY AND STANDARDS	: As Per Requirement
PRODUCTION CAPACITY	: Quantity : 1500 M.T. Value : Rs. 2,10,00,000
MONTH AND YEAR OF PREPARATION	: February, 2003
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INTRODUCTION

This scheme covers grey cast iron castings of Heavy Mass upto 1.5 M.T.

For Example:

1. Roller castings for sugar mills.
2. Rack and gear boxes for General Engg. Works.
3. Ingot moulds for mini-Steel Plants.

MARKET POTENTIAL

The market potential of heavy grey iron castings is good and expected to be bright in future. These Castings are required by sugar mills, General Engineering Works and Mini-Steel Plants. The demand for such castings is increasing continuously due to rapid industrialization.

BASIS AND PRESUMPTIONS

1. The project profile has been prepared on the basis of single shift of 8 hrs. a day and 25

working days in a month at 75% efficiency.

2. It is presumed that in the first year, the capacity utilization will be 70% followed by 85% in the next year and 100% in the subsequent year.
3. The rates quoted in respect of salaries and wages for skilled workers, and others are on the basis of minimum rates in the State of U.P.
4. Interest rate for the fixed and working capital has been taken @ 18% on an average whether financed by Bankers or Financial Institutions.
5. The margin money required is minimum (30% of the total capital investment)
6. The rental value for the accommodation of office, workshop and other covered area has been taken @ Rs. 20/ sq. mtr.
7. The rate quoted in respect of machinery, equipment and raw materials are those prevailing at

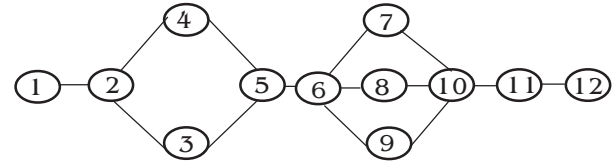
the time of preparation of the project profile and are likely to vary from place to place and suppliers to suppliers. When a tailor-made project profile is prepared, necessary changes are to be made.

8. The pay back period may be 5 years after the initial gestation period.
9. The gestation period in implementation of the project may be to the tune of 6 to 9 months which includes making all arrangements, completion of all formalities, market surveys and tie-ups etc. Once all the above arrangements are made and quality/standards achieved, the 100% project capacity may be achieved at the end of three years. However, a detailed PERT/CPM chart with implementation period has been given in the report.

IMPLEMENTATION SCHEDULE

The implementation of the project includes various jobs/exercises such as procurement of technical knowhow, transfer of technology, market surveys and tie-ups, preparation of project report, selection of site, registration, financing of project, procurement of machinery and raw materials etc., recruitment of staff, erection/commissioning of machines, trial production and commercial production etc. In order to efficiently and successfully implement the project in the shortest period, the slack period is curtailed to minimum possible and as far as possible simultaneous exercises

are carried out. In view of above, a CPM- PERT Chart has been illustrated below, according to which a minimum period of 227 days is involved in finally starting the project on commercial basis. By following this process a time period of 82 days can be saved.



Details of Activities

C.P.M.

Activity	Days	Activity	Days	Particulars of Activity
1-2	15	1-2	15	Procurement of Tech. know how/ transfer of technology.
3-4	15	3-4	15	Market survey, tie up and obtaining quotations
4-5	7	2-3	7	Selection of site
5-6	70	4-5	7	Preparation of Project report
6-7	45	5-6	70	Registration and financing
7-10	30	6-7	45	Placement of orders for machinery and receipt of machines
10-11	30	6-8	30	Recruitment of staff and training
11-12	15	6-9	30	Addition/Alteration in rental premises
		8-10	15	Procurement of raw material/Bought out components
		7-10	30	Erection, Electrification and Commissioning
		10-11	30	Trial Production
		11-12	15	Commercial Production
Total	227		309	

TECHNICAL ASPECTS

Process of Manufacture

Grey cast Iron heavy castings are produced by melting pig iron and C.I. scrap in cupola furnace. The molten metal is poured in dry sand moulds to avoid the mould dilution. Cores are made of silicon sands dried and coated with graphite paste. Graphite paste is prepared from graphite powder and Bentonite mixed in water. The cores are dried in coal fired chamber properly before use in mould. Molten metal is poured in moulds cavity with the help of a ladle. Castings are taken out of the mould after getting cooled. After breaking the runner and risers castings are fettled properly.

Quality Control and Standards

Product as per requirements of the customer. The relevant standards of BIS are given below:

IS: 12006-1967-	Metal patterns and pattern equipments.
IS: 6186-	Bentonite.
IS: 1305-1984-	Graphite for use in foundry.
IS: 224-1979-	Foundry Pig Iron for General Purpose.
IS: 1110-1987-	Ferrosilicon.
IS: 1987-1974-	High silicon sand for use in foundries.
IS: 4836-1968-	Coke.
IS: 4140-1978-	Limestone for foundries.

Production Capacity (per annum)

Quantity - 1500 MT

Value - Rs. 210 Lakhs.

Motive Power

Foundry shop	30 H.P.
Fettling Shop +Machine Shop	<u>15 H.P.</u>
Total	45 H.P.

Pollution Control

1. This industry involves pollution to some extent for which State Pollution Control Board has to be approached.
2. Minimum height of shed will be maintained with exhaust fans installed for removing decongestion, proper ventilation, removal of cokes, fumes etc.

Energy Conservation

The following steps may be taken for the conservation of energy:

1. Machinery and Equipment parts, which are revolving and reciprocating should be properly lubricated from time to time with suitable lubricant oil.
2. Layout of the unit should be in such a way that no back tracking of material is there.
3. All electric switches may be kept off, when not required.
4. The entire transmission belt will be tightened before starting the work wherever applicable.
5. Fluorescent tube with electronic Chokes may be used for energy saving. Further recently developed compact fluorescent tubes called (CFT) of 10-15 watts Philips/Glaux made may be used for energy saving and decoration. These self ballasted fluorescent lamps are high efficiency

replacements for ordinary bulbs. For same light output, CFLEBs consume about one-fifth the power consumed by ordinary bulbs, thereby saving a lot of energy. The savings get further multiplied when CFLEBs are used in air-conditioned areas, since the saving of energy by using CFLEBs also corresponds to less heat dissipation reducing load on air conditioners. The life of CFLEBs is about 8000/10000 hours i.e. about 10 times that of ordinary bulb.

The typical payback period in terms of savings of energy bills and cost of ordinary lamps is about 6 months operation. Unlike ordinary bulbs, these CFLEBs provide choice of three colours designated A, B and C, to suit individual requirements.

Electronic Ballast, with protection against high voltage spikes, along with high quality CFLs make these composite CFLEBs (or self ballasted CFLs) slim, lightweight, efficient and reliable units.

6. As far as possible Solar Energy and daylight will be used keeping all the other lights off.
7. As far as possible, inductive load of motor will be reduced and high power factor will be used with the aid of capacitors of appropriate sizes.

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building (Rented)	(Rs.)
On Rent @ Rs.20 sq. meter	6,000
Covered Area 300 sq. meter	

(ii) Machinery and Equipments

Sl. No.	Description	HP/KW Ind/Imp.	Qty.	Amount (In Rs.)
<i>(a) Production Unit</i>				
1.	30" dia cupola with 7.5 HP Motor and Accessories	Ind.	1	2,40,000
2.	E.O.T. Overhead Crane 3 HP capacity	Ind.	1	2,40,000
3.	Sand Mullar with 5 HP Motor and accessories (Cap. 250 Kg. Batch type)	Ind.	1	50,000
4.	Sand Mixer (250 Kg. Cap.) with 5 HP Motor	Ind.	1	35,000
5.	Coal fired hot compartment for drying mould and cores (2m x 2m x 4m)	Ind.	2	1,00,000
6.	Ladles of 2 M.T. Cap. (Geared)	Ind.	2	90,000
7.	Flexible Shaft Grinder (Grinder with 2 HP motor)	Ind.	2	20,000
8.	Lathe machine with accessories 2 HP motor	Ind.	2	1,50,000
9.	Drilling Machine (1 HP motor)	Ind.	2	25,000
10.	Air Compressor 4.8 cft. with 3 HP motor.	Ind.	1	25,000
11.	Weigh bridge 1 ton capacity		1	30,000
<i>(b) Testing Equipments</i>				
i) Sand Testing Equipments				50,000
ii) Inspection Equipment like hardness tester, Micrometer, Calipers, Pyromoters etc.				40,000
<i>(c) Pollution Control Equipment, if required</i>				50,000
<i>(d) Energy Conservation Facilities/ Equipment:</i>				20,000
			Total	11,65,000
<i>(e) Cost of power connection</i>				4,000
<i>(f) Electrification and Installation Charges @ 10%</i>				1,16,500

(g) Cost of Moulds/Jigs/ Fixtures/Dies etc.	2,00,000
(h) Cost of Office Equipment/ Working Table etc.	20,000
Total (a + b + c + d + e + f + g + h)	15,05,500
(iii) Pre-Operative Expenses	40,000
Total Fixed Capital	15,45,500

B. Working Capital (per month)

(i) Personnel

Staff and Labour

Sl. No.	Designation	No.	Salary (In Rs.)	Amount (In Rs.)
<i>(a) Administrative and Supervisory</i>				
i)	Manager cum-Metallurgist	1	5000	5,000
ii)	Supervisor/ Foreman	2	3000	6,000
iii)	Accountant (part time)	1	2000	2,000
iv)	Clerk cum Typist	1	2000	2,000
v)	Storekeeper	1	2000	2,000
iv)	Peon-cum- watchman	1	1500	1,500
<i>(b) Technical Workers</i>				
(i)	Skilled Workers	6	2500	15,000
(ii)	Semi Skilled Workers	6	2000	12,000
(iii)	Helpers	8	1500	12,000
Total				57,500
<i>Perquisites @ 15%</i>				8,625
Total				66,125

(ii) Raw Material (per month)

Sl. No.	Particulars	Qty.	Rate (In Rs.)	Amount (In Rs.)
1.	Pig Iron (Foundry Grade)	100 MT	8000 per MT	8,00,000
2.	Cast Iron Scrap	50 MT	7000 per MT	3,50,000
3.	Coke	30 MT	6000 per MT	1,80,000

4. Foundry Chemicals and Various Consumables (like Fireclay, Fire-bricks, Steam Coal, Graphite, Coal Dust, Bentonite, Silica-sand, River-sand, Ferrosilicon, etc.	1,00,000
Total	14,30,000

(iii) Utilities (per month)	(Rs.)
Electricity	25,000
Water	1,000
Total	26,000

(iv) Other Contingent Expenditure (per month) (Rs.)	
1. Rent	6,000
2. Postage and Stationery	1,000
3. Advertisement	5,000
4. Repair and Maintenance	1,000
5. Telephone	1,000
6. Transportation	4,000
7. Consumable	1,000
8. Sales expenses	2,000
9. Insurance	1,000
10. Taxes	1,000
11. Misc. Expenses	1,000
Total	24,000

(v) Total Recurring Expenditure (per month) **Rs. 15,46,125**

(vi) Working Capital for three months **Rs. 46,38,375**

C. Total Capital Investment

(i) Fixed Capital	Rs. 15,45,500
(ii) Working capital for 3 months	Rs. 46,38,375
Total	61,83,875

MACHINERY UTILIZATION

It is expected that during first year machine utilization will be 70% and during second year 85% and 100% in subsequent years.

FINANCIAL ANALYSIS

(i) Cost of Production (per annum)	(Rs.)
(a) Total Recurring Cost	1,85,53,500

(b) Depreciation on Building @ 5% if any	Nil
(c) Depreciation on Machinery and Equipment @ 10%	94,550
(d) Depreciation on Furnace @20%	68,000
(e) Depreciation on Jigs Fixture and Dies @ 25%	50,000
(f) Depreciation on Office Equipments @ 20%	4,000
(g) Interest on Total Capital Investment @ 18%	11,13,000
Total	1,98,83,050

(2) Turn Over (per annum)

Sl. No.	Particulars	Qty.	Rate (In Rs.)	Amount (In Rs.)
1.	Heavy Castings up to 1.5 MT	1500 MT	15000 MT	2,25,00,000
	Total			2,25,00,000

(3) Net Profit (Before Income Tax)

Turnover – Cost of Production = **Rs. 26,16,950**

(4) Net Profit Ratio

Net profit × 100/Turn over = **11.6%**

(5) Rate of Return

$\frac{\text{Net Profit} \times 100}{\text{Total investment}}$
= **32.73%**

(6) Break-even Point

Fixed Cost (per annum)	(In Rs.)
(a) Total Depreciation (on m/c. and equipment, dies, tools, furniture)	2,16,550
(b) Rent	72,000
(c) Interest on Borrowing (Total Investment)	11,13,000
(d) Insurance	
(e) 40% of Personnel Cost	3,17,400
(f) 40% of Other Contingent Expenses (Excluding Rent and Insurance)	81,600
Total	18,00,550

$$\text{B.E.P.} = \frac{\text{Fixed Cost} \times 100}{\text{Fixed cost} + \text{profit}} = 47\%$$

Addresses of Machinery and Raw Material Suppliers

- M/s. The Wasman Engg. Co. Ltd.
1/2, Allenby Road,
Kolkata-700020
For Foundry Equipment
- M/s. SANAS Foundry Project Engineers
28, Vijay Nagar Colony, 2130,
Sadashiv Path,
Pune-411030
For Foundry Equipment and Consultants
- M/s. Pioneer Equipment Co. P. Ltd.
432, Padra Road,
Baroda
For Foundry Equipment
- M/s. Met International
No. 8, O.T.C. Road,
Nagarthpaet,
Bangalore-560-002.
- M/s. Steel Authority of India Ltd.
For Pig Iron
- M/s. Raw Material Dipot of State Directorate of Industries
For Pig Iron
- M/s. Open Market
For C.I. Scrap
- M/s. IVP Ltd.
Jolly Bhawan No. 2, Marine Lines,
Mumbai
(Branches all over India)
For Foundry Chemical
- M/s. Fincast Foundry
Flux Company,
Plot No. 303, GiDC Estate, ODHAV,
Ahmedabad-382415
For Foundry Chemical
- M/s. Sagri Industries
2, Mercantile, Apartments Opp.
Basant Cinema, Chembur,
Mumbai-74
For Foundry Chemical