Profile No.: 34 **NIC Code: 24319**

STEEL CASTING

1. INTRODUCTION:

Forging is a manufacturing process involving the shaping of metal using localized compressive forces. The blows are delivered with a power hammer in open or close die. Forging is often classified according to the temperature at which it is performed: cold forging, warm forging, or hot forging.

The metal takes the shape of the die and very strong parts can be produced due to the favorable orientation of the grain. Forging can produce a piece that is stronger than an equivalent cast or machined part.

Forgings are usually selected for applications requiring high ductility, impact toughness, fracture toughness and fatigue strength; therefore, forging alloys with inherently high ductility and tensile strength are generally selected.

2. PRODUCT & ITS APPLICATION:

Forged Metal components are the most widely used, in all the products and manufacturing sectors for wide ranging applications. The majority of forging alloys are in one of seven primary alloy groups: Carbon, micro alloy and alloy steels, Stainless steels, Aluminum alloys,

Copper alloys, iron, nickel, or cobalt based heat resistant alloys, Titanium and Magnesium alloys.

High-strength alloys have the better tensile strength and fatigue strength. For most load bearing and rotating or high pressure environment components are made from of specific strong steel alloys that provide significant advantages.

For industrial application, primarily steel alloys are forged in hot condition. Brass, bronze, copper, precious metals and their alloys are manufactured for special applications. Each metal requires a different forging temperature.

Aluminum, titanium and other nonferrous metal forged parts are mainly used in aerospace, automotive industry and many other fields of engineering, where highest safety standards against failure by abuse, by shock or vibratory stresses are needed. Such parts are for example chassis parts, steering components and brake parts.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

The promoter with mechanical engineering degree and experience in steel forging industry will be able to be able to manage the project well. The entrepreneur should specialize in specific product range.

4. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Forged components find wide application in automobile, industrial machinery, Heavy Earth moving equipment, hydraulic systems, mining, process industry for high pressure piping, valves, pumps and turbines, electrical machines, aerospace, nuclear plants etc. to fasteners. Defense and ship building also used large percentage of forged metal products.
Most of the forged parts are critical components like shaft, stem, fasteners, auto engine parts like crankshaft, connecting rod, gears, lifting tools and tackles, hydraulic cylinders and valve bodies etc.
Huge demand potential exists for forged components in domestic as well exports market.

5. RAW MATERIAL REQUIREMENTS:

MS and SS steel alloy billets, bars, rods and flats of special forging grade are required for different product to be manufactured by the unit. Carbon steel is available in Grades from C1006 up to C1095, with the carbon increasing from 0.06% to 0.95%. For other alloys specifications are available from BIS and other international bodies.

The hot forging products range is considered here. Unit may need to source the quality material sources from appropriate quality suppliers to ensure end quality of products.

6. MANUFACTURING PROCESS:

Drop forging is a forging process where a hammer is raised and then "dropped" onto the work piece to deform it according to the shape of the die. Press forging works by slowly applying a continuous pressure or force, which differs from the near-instantaneous impact of drop-hammer forging. The unit can consider both manufacturing processes one after another. The plant investment may range from 80 to 1500 lakhs depending on forging equipment selection.
The process involves cutting of blanks from billet, rods or flats in desired sizes, heating in furnace or with help of induction heating system to a required temperature and forging to the required shape under a drop hammer or press with help of dies.

The forged component may be cooled in controlled atmosphere to achieve metallurgical properties. The unit can also machine the components as per the required to achieve the finished product.

7. MANPOWER REQUIREMENT:

The unit shall require highly skilled persons. The unit can start from 25 employees and increase to 75 or more depending on business volume.

Sr. No.	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	20000	10	10	20	25	30
2	Semi-Skilled/ Helpers	8000	15	15	25	30	35
3	Supervisor/ Manager	25000	2	2	3	3	3
4	Accounts/ Marketing	18000	2	2	2	4	4
5	Other Staff	7000	1	1	2	2	2
	TOTAL		30	30	52	64	74

8. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work. The unit should be located near a major industrial center with good road connectivity.

Sr. No.	Activities	Time Required in Months
1	Acquisition of Premises	2
2	Construction (if Applicable)	2
3	Procurement and Installation of Plant and Machinery	2
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	1
	Total Time Required (Some Activities run concurrently)	6

9. COST OF PROJECT:

The unit will require total project cost of Rs. 242.69 lakhs as shown below:

Sr. No.	Particulars	In Lakhs
1	Land	25.00
2	Building	40.00
3	Plant and Machinery	95.00
4	Fixtures and Electrical Installation	7.15
5	Other Assets/ Preliminary and Preoperative Expenses	3.50
6	Margin for working Capital	72.04
	TOTAL PROJECT COST	242.69

10. MEANS OF FINANCE:

The project will require promoter to invest about Rs 114.70 lakhs and seek bank loans of Rs 127.99 lakhs based on 70% loan on fixed assets.

Sr. No.	Particulars	In Lakhs
1	Promoters Contribution	114.70
2	Loan Finance	127.99
	TOTAL :	242.69

11. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No.	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	41.46	40	16.58	24.87
2	receivables	52.95	50	26.48	26.48
3	Overheads	12.39	100	12.39	0.00
4	Creditors	41.46	40	16.58	24.87
	TOTAL	148.26		72.04	76.22

12. LIST OF MACHINERY REQUIRED:

The layout of unit suitable for different activities are planned to ensure smooth material and product flow.

Sr. No.	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Induction Heater for blanks	Nos.	2	1000000	2000000
2	Blank/ Billet cutting machines	Nos.	3	150000	450000
3	Pneumatic Forging Hammer	Nos.	2	450000	900000
4	Mech Forging Hammer	Nos.	2	145000	290000
5	800 T Hydraulic Forging Press	Nos.	1	4500000	4500000
6	Die Repair/ Finishing Tools	LS	1	200000	200000
7	Milling Machine	Nos.	1	200000	200000
8	Pillar drilling machine	Nos.	1	25000	25000
9	Air Compressor System	Nos.	1	200000	200000
10	Lathes	Nos.	3	75000	225000
	subtotal :				8990000

Sr. No.	Particulars	UOM	Quantity	Rate	Total Value
1	Tools and Ancillaries				
2	Bench and Belt Grinders	LS	1	15000	15000
3	Forging Dies and Tools	Nos.	15	20000	300000
4	Portable Tools	LS	1	50000	50000
5	Gauges, Testing Machines and tools	LS	1	145000	145000
	subtotal :				510000
	Fixtures and Elect Installation				
	Storage racks	LS	1	15000	15000
	Other Furniture	LS	1	10000	10000
	Telephones/ Computer	LS	1	40000	40000
	Electrical Installation	LS	1	650000	650000
	subtotal :				715000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	350000	350000
	TOTAL PLANT MACHINERY COST				10565000

13. PROFITABILITY CALCULATIONS:

Sr. No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Sales	Rs Lakhs	635.40	847.20	1059.00	1270.80	1482.60
2	Raw Materials & Other Direct Inputs	Rs Lakhs	497.50	663.33	829.16	994.99	1160.82
3	Gross Margin	Rs Lakhs	137.90	183.87	229.84	275.81	321.78
4	Overheads Except Interest	Rs Lakhs	81.24	81.24	81.24	81.24	81.24
5	Interest	Rs Lakhs	17.92	17.92	17.92	17.92	17.92
6	Depreciation	Rs Lakhs	17.48	17.48	17.48	17.48	17.48
7	Net Profit Before Tax	Rs Lakhs	21.27	67.24	113.20	159.17	205.14

14. BREAK EVEN ANALYSIS

The project is can reach breakeven capacity at 25.37 % of the installed capacity as depicted here below:

Sr. No.	Particulars	UOM	Value
1	Sales at Full Capacity	Rs Lakhs	2118.00
2	Variable Costs	Rs Lakhs	1658.32
3	Fixed Cost incl. Interest	Rs Lakhs	116.64
4	Break Even Capacity	% of Inst Capacity	25.37

15. REMARKS

Forging is an ancillary industry and mass production and hence needs that entrepreneur ties up with the OE manufacturers for better success. He may also try to focus on certain traded product range viz auto parts and he general industrial products viz pipe fittings etc.