

WIRE DRAWING

1. INTRODUCTION:

Drawing of wire from metal rod is a metal working process that reduces the cross-section and elongates in to wire. During wire drawing the volume of metal remains the same and hence there is increase in the length of the drawn wire. A significant advantage of drawing is that there is very little material waste. It is carried out by pulling the metal rod through a single or a series of the drawing dies.

In the case of series of drawing dies, the each subsequent drawing stage uses smaller bore diameter than the previous drawing die. The draw ratio of diameter depends on elongation and plastic de-formability of meta; Drawing is usually performed in round sections at room temperature, however, it is also performed at higher temperatures for large wires to reduce forces.

2. PRODUCT & ITS APPLICATION:

Wire/rod drawing is an important industrial process, providing commercial products. Wire products cover a very wide range of applications which include smaller diameter rods used for shafts of different diameter for machine and wire rods for structural components, blanks for bolts, rivets, nails screws, fences, spring wires pins, staples, needles, and many others.

Commercial wire drawing usually starts with a coil of hot rolled 9 mm diameter wire. The surface is first treated to remove scales. It is then fed into a wire drawing machine which may have one or more blocks in series.

Wires are drawn from carbon steel, alloy steel, stainless steel, etc. ferrous metals as also from aluminum, copper, brass, bronze and many other alloys. Nonferrous wires are used in

electrical power transmission, viz. wires and cables, electronics systems and even in semiconductor IC etc. packaging, motor and transformer windings.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Any graduate with experience in the field, preferably with engineering/ science background.

4. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

Construction, machinery and automotive markets especially present significant opportunities for steel wire. Steel wires are also used in a range of infrastructure constructions and many general engineering applications in machinery and heavy equipment and marine industry. In the automotive industry, steel wires are used for reinforcing tires to add to their strength and durability. Steel binding wires are used to bind and fabricate complex steel reinforcement structures for building of all types. Steel wire is of critical importance in automotive manufacturing for controls,

The projected increase in infrastructure and housing construction and Automobile sector in the coming years is expected to benefit demand for steel and other metal wire industry. Steel wire finds mission critical use in this sector as drilling lines, geophysical cable, offshore mooring ropes and electromechanical cable, and for mooring anchoring, towing, and lifting applications. There is a plethora of growth opportunities for Indian steel wire market. Rapidly expanding construction, infrastructure, telecom and manufacturing industries bode well for the Indian steel wire market.

5. RAW MATERIAL REQUIREMENTS:

Various grades of steel and other metal e.g. copper wire rods are required. These are available from 6 mm to 12 mm diameter size. Normally 6 mm wire is procured for drawing. For higher diameter rods, in-house Rod breakdown machine or outside job work is normally required. Other materials consist of lubricant powder soaps of different grades and fuel for annealing furnace.

6. MANUFACTURING PROCESS:

Coating:

The surface of the bar or coil is coated with a drawing lubricant to aid cold drawing.

Pointing:

Several inches of the input end of the bar or coil is reduced in size by swaging or extruding so that it can pass freely through the first drawing die.

Drawing:

The drawing machine pulls or draws the lead wire bar or coil through the die in single or multiple stages. The die reduces the cross section of the bar or coil, shapes the profile of the product and increases length in each stage. In multi-pass drawing wire passes through smaller and smaller dies. Material may require annealing to soften the material and increase ductility, after certain stage between drawing pass to remove hardening and brittleness due to cold work.

Finished Product:

The drawn product passes through final finishing die to get bright and/or polished finish. Heat treatment is generally used to soften the material, to modify the microstructure, improve mechanical properties and the machining characteristics and get precise and uniform dimensional tolerances.

The finished product is tested for tensile and hardness testing, and measuring of the diameter.

In case of drawing of stainless steel or other materials, wire/rod has to be inspected and /or treated. Surface preparation is done by pickling in acid (ferritic and martensitic steels) or basic solutions (austenitic steels). The prepared skin is then coated with lubricant. Cold drawing is carried out through diamond dies or tungsten carbide dies till the desired diameter is achieved.

7. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 12 employees initially and increase to 39 or more depending on business volume.

Sr. No	Type of Employees	Monthly Salary	No of Employees
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			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	18000	3	4	6	8	12
2	Semi-Skilled/ Helpers	7000	6	8	12	16	24
3	Supervisor/ Manager	30000	1	1	1	1	1
4	Accounts/ Marketing	16000	1	1	1	1	1
5	Other Staff	7000	1	1	1	1	1
	TOTAL		12	15	21	27	39

8. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

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. 126.22 lakhs as shown below:

Sr. No	Particulars	In Lakhs
1	Land	20.00
2	Building	35.00
3	Plant and Machinery	33.80
4	Fixtures and Electrical Installation	4.30
5	Other Assets/ Preliminary and Preoperative Expenses	2.00
6	Margin for working Capital	31.12
	TOTAL PROJECT COST	126.22

10. MEANS OF FINANCE:

The project will require promoter to invest about Rs. 54.89 lakhs and seek bank loans of Rs. 71.33 lakhs based on 70% loan on fixed assets.

Sr. No	Particulars	In Lakhs
1	Promoters Contribution	54.89
2	Loan Finance	71.33
	TOTAL:	126.22

11. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr. No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	22.62	40	9.05	13.57
2	Receivables	26.21	40	10.48	15.72
3	Overheads	2.54	100	2.54	0.00
4	Creditors	22.62	40	9.05	13.57
	TOTAL	73.99		31.12	42.87

12. LIST OF MACHINERY REQUIRED:

Sr. No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Bull Block Wire drawing Lines	Nos	2	650000	1300000
2	Wire Rod Breaking Machine	Nos	1	600000	600000
3	Wire pointing and welding machine	Nos	1	60000	60000
4	Coilers and DE coilers	Nos	8	30000	240000
5	Die Repair and Polishing machine	Nos	1	150000	150000
6	Annealing furnace	Nos	1	450000	450000
Sr. No	Particulars	UOM	Quantity	Rate	Total Value

7	Pickling line	Nos	1	250000	250000
8	Surface treatment tank	Nos	1	140000	140000
9	Pillar drilling machine	Nos	1	60000	60000
	Subtotal:				3250000
	Tools and Ancillaries				
1	Misc. equipment Dies tools etc.	LS	1	100000	100000
2	Hand Tools and gauges	LS	1	30000	30000
	Subtotal:				130000
	Fixtures and Elect Installation				
	Storage and transport bins and trolleys	LS	1	20000	20000
	Office Furniture	LS	1	30000	30000
	Telephones/ Computer	LS	2	40000	80000
	Electrical Installation	LS	1	300000	300000
	Subtotal:				430000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	200000	200000
	TOTAL PLANT MACHINERY COST				4010000

13. PROFITABILITY CALCULATIONS:

Sr No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	40	50	60	70	80
2	Sales	Rs. Lakhs	314.49	393.11	471.73	550.35	628.98
3	Raw Materials & Other Direct Inputs	Rs. Lakhs	271.46	339.32	407.18	475.05	542.91
4	Gross Margin	Rs. Lakhs	43.03	53.79	64.55	75.31	86.07
5	Overheads Except Interest	Rs. Lakhs	20.44	20.44	20.44	20.44	20.44
6	Interest	Rs. Lakhs	9.99	9.99	9.99	9.99	9.99
7	Depreciation	Rs. Lakhs	7.51	7.51	7.51	7.51	7.51
8	Net Profit Before Tax	Rs. Lakhs	5.10	15.85	26.61	37.37	48.13

14. BREAK EVEN ANALYSIS

The project is can reach breakeven capacity at 35.26 % of the installed capacity as depicted here below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs. Lakhs	786.22
2	Variable Costs	Rs. Lakhs	678.64
3	Fixed Cost incl. Interest	Rs. Lakhs	37.94
4	Break Even Capacity	% of Inst Capacity	35.26