Welding Electrodes

PRODUCT CODE	:	N.A.
PRODUCTION CAPACITY	:	Quantity : 1980 M.T. Value : Rs. 2,77,20,000
MONTH AND YEAR OF PREPARATION	:	October, 2002
PREPARED BY	:	Small Industries Service Institute Indl. Estate, Nanhai, Agra - 282005

Introduction

Welding electrodes are used for Arc welding purposes. The electrode is coated with the flux. Although electrodes are produced in different gauges, for the purpose of calculation for financial implications of technical details, the assumption has been made for the production of electrodes of 4mm dia core rods. The electrodes are used for fabrication work for joining the steel, alloy steel and cast iron parts for hard facing of jobs etc.

Market Potential

Earlier this item was only manufactured in medium and large scale sector. But now this item is manufactured in small scale sector with quality product and competitive prices. There is a good number of units in small scale sector and large demand for this item due to large construction fabrication work. There is sufficient gap between the demand and supply.

In spite of the indigenous availability of electrodes, special electrodes are still imported. There is very good scope for this item.

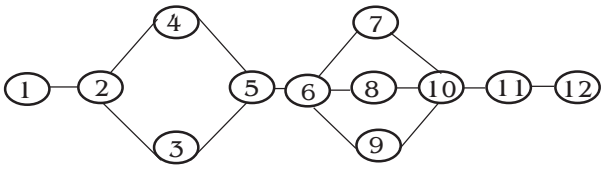
Basis and Presumptions

1. The project profile has been prepared on the basis of Single Shift of 8-hours a day and 25 working days in a month at 75% efficiency.
2. It is presumed that in the Ist year, the capacity utilization will be 70% followed by 85% in the next year and 100% in the subsequent years.
3. The rates quoted in respect of salaries and wages for skilled worker and others are on the basis of minimum rates prevailing 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 the Bank 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 rates 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 supplier to supplier. 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 these 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.

IMPLEMENTATION SCHEDULE

The implementation of the project includes various jobs/exercises such as procurement of technical know–how, 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 a minimum possible and 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
227 days		**309 days**		

TECHNICAL ASPECTS

Process of Manufacture

Electrodes of different types are produced but for calculation purposes 4mm size product has been considered. In this scheme, provision is made for general type of welding electrodes.

The drawn Electrode quality wire of 4mm size is first straightened on straightening machine and cut to size and stored. The flux as per the formulation is to be prepared in the dry blender and wet mixer. Then slug is to be made in the cylindrical form in the automatic slug press. Then slug is to be placed in the extrusion press and straight cut wires in the wire feeder hopper with the help of extrusion press. Flux coated on core wire rod is passed on conveyor system and collected at the end.

These flux coated rods are then sent to drying oven for drying purposes. After drying, it is to be packed and ready for despatch.

Alternate Technology : *Nil*

Quality Control and Standards

Quality Control and Standards are very important factors in the manufacturing of electrodes. For Mechanical, Metallurgical and Chemical testing, provision has been made in the testing laboratory. For quality control following tests are to be conducted:

1. Tensile Test
2. Hardness Test
3. Compression Test
4. Impact Test
5. Chemical Test
6. Bending Test
7. Microscope Test
8. Moisture determination and so on.

Motive Power

15 K.V.A.

Water Requirement: 100 K.L./ month.

Pollution Control

1. This industry does not come under the category of heavy polluting industry.
2. Minimum height of shed will be maintained. Exhaust fans should be 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 of 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 day light 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)
Covered Area 900 Sq. mtrs. @ Rs. 20 sq. mtrs.	18,000
Uncovered area 100 Sq.mtrs. @15 sq.mtrs.	1,500
Total	**19,500**

(ii) Machinery and Equipments

Sl. No.	Description	HP/KW Ind/Imp.	Qty.	Amount (In Rs.)
	(a) Production Unit			
1.	Steel Hopper for storage and Chemicals		20 Nos.	20,000
2.	Containers for blended flux		20 Nos.	20,000
3.	Wet Mixer		-	70,000
4.	Automatic slug press 90 M.T.cap.			2,00,000
5.	Dry blender 1 M.T.Cap.			70,000
6.	Weighing machine for discharge flux			8,000
7.	Sieving Vibrating machine			16,000
8.	Weighing machine for blending mass			8,000
9.	Silicate weighing machine			10,000
10.	Lifting tables bogies containers			30,000
	Total			**4,52,000**
	(b) Extrusion and Drying Department			
1.	Extrusion Press with electric moter for testing rods: 150 M.T.}			
2.	Wire feeders for feeding lengths up to 9" to 12"			6,50,000
3.	Conveyer System with finishing unit			1,50,000
4.	Electrically heated drying Oven			1,50,000
5.	Wire Straightening and Cutting Machine			80,000
6.	Drying Tray, Trollies			50,000
7.	Wire recovery plant with flux striper washing equipment and Dryers			70,000
8.	Arbor Press			50,000
9.	Drilling machine 1" capacity			7,000
10.	Lathe -6 feet bed length			50,000
11.	Pedestal Grinder			8,000
12.	Storage bins racks, fitter tanks etc.			50,000
13.	Gas welding equipment			20,000
	Total			**13,35,000**

(c) Testing Equipments	
1. Carbon, Sulphur determination apparatus	20,000
2. Moisture determination equipments	8,000
3. Arc Welding Transformer 400 Amp.	12,000
4. One Small electrically heated bath	12,000
5. Bench Grinder	3,000
6. Rockwell hardness tester	30,000
7. Microscope	50,000
8. Izod Impact testing machine	28,000
9. 20-Ton universal testing machine	1,50,000
10. Weighing Balance	4,000
11. Misc. Chemical laboratory equipment	30,000
Total	**3,47,000**
(d) Pollution Control Equipments	20,000
(e) Energy Conservation Facilities/ Equipments	20,000
Total (a+b+c+d+e)	**21,74,000**
(f) Electrification and Installation Charges @ 10%	2,17,400
(h) Cost of Furniture and Equipment	1,00,000
(iii) Pre-operative Expenses	**14,600**
Total Fixed Capital (ii+iii)	**25,06,000**

B. Working Capital (per month)

Staff and Labour

(i) Personnel

Sl. No.	Designation	No.	Salary (In Rs.)	Amount (In Rs.)
i)	Manager Technical	1	6000	6,000
ii)	Metallurgist	1	5000	5,000
iii)	Production Engineer	1	5000	5,000
iv)	Foreman	1	4000	4,000
v)	Chief Chemist	1	5000	5,000
vi)	Supervisors	2	3500	7,000
vii)	Chemist	1	5000	5,000
viii)	Skilled Workers	12	3000	36,000
ix)	Semi Skilled Workers	18	2700	48,600
x)	Helper	18	2000	36,000
xi)	Storekeeper	1	2700	2,700
xii)	Clerk cum Typist	1	2700	2,700
xiii)	Watchman	3	2000	6,000
xiv)	Peon	1	2000	2,000
	Total			**1,71,000**
	Perquisites @ 15%			**25,650**
	Total			**1,96,650**
	Say			**1,97,000**

(ii) Raw Material

Particulars	Qty.	Rate (In Rs.)	Amount (In Rs.)
Coating flux compound Containing following Ingredients Sodium, silicate, powdered quality of ferrosilicon Rugeon Chalk Fluorite, Soda, Starch, Powder, Dolomite, Tin, Titanic Oxide, Potash, Mica, Ferromanganese-Destrin, Limnite, Iron, Powder, Rutile etc.	50 Tones	10,000/ Tones	5,00,000
4 mm Core Steel Wire	133 M.T.	9,000/ M.T.	11,97,000
	Total		**16,97,000**

(iii) Utilities (per month)			(Rs.)
Electricity	3550 units	3 per units	10,650
Water	100 KL		500
	Total		**11,150**
	Say		**11,000**

(iv) Other Contingent Expenses (per month)	(Rs.)
1. Rent	19,500
2. Postage and Stationery	1,200
3. Advertisement	5,000
5. Telephone	1,000
6. Transportation	2,000
7. Consumable	3,000
8. Sales Expenses	5,000
9. Insurance	2,000
10. Repair and Maintenance	5,000
11. Misc. Expenses	6,000
Total	**49,700**

(v) Total Recurring Expenditure (per month) (Rs.)	
1) Salary and Wages	1,97,000
2) Raw Material	16,97,000
3) Utilities	11,000
4) Other Contingent Expenses	49,700
Total	**19,54,700**

(vi) Working Capital for 3 Months

19,54,700 × 3 = **Rs. 58,64,100**

C. Total Capital Investment

Fixed capital	25,06,000
Working capital (for 3 Months)	58,64,100
Total	**83,70,100**

MACHINERY UTILIZATION

It is expected that during first year machine utilization will be 75% followed by 85% during second year and 90% in subsequent years.

FINANCIAL ANALYSIS

(1) Cost of Production (per annum)	(Rs.)
(a) Total Recurring Cost	2,34,56,400
(b) Depreciation on Machinery and Equipment @ 10%	2,10,400
(c) Depreciation on Office Equipments @ 20%	20,000
(d) Interest on Total Capital Investment @ 18%	15,06,600
Total	**2,51,93,400**

(2) Turnover (per annum)

Sl. No.	Description	Qty.	Rate (In Rs.)	Amount (In Rs.)
1.	M.S. Electrodes (4mm) (Normally electrodes are sold in the market on No. of PCS/running feet) hence we have taken on weight basis for calculation purchase	1980 MT	14000	2,77,20,000
			Total	**2,77,20,000**

(3) Net Profit (per annum) *(Before Income Tax)*

Rs. 2,77,20,000–2,51,93,400 = **Rs. 25,26,600**

(4) Net Profit Ratio

$$\frac{\text{Net profit} \times 100}{\text{Turn over}} \quad \frac{25,26,600 \times 100}{2,77,20,000} = \mathbf{9.1\%}$$

(5) Rate of Return

$$\frac{\text{Net profit} \times 100}{\text{Total investment}} \quad \frac{25,26,600 \times 100}{83,70,100} = \mathbf{30.1\%}$$

(6) Break-even Point

Fixed Cost (per annum)	(Rs.)
(a) Total Depreciation	2,30,400
(b) Rent	2,34,000
(c) Interest on borrowing (Total Investment)	15,06,600
(d) Insurance	24,000
(e) 40% of salary	9,45,600
(f) 40% of other contingent expenses (Excluding rent and insurance)	1,35,000
Total	**30,75,600**

B.E.P.

$$= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost + Profit}} \quad \frac{30,75,600 \times 100}{56,02,200} = \mathbf{54.8\%}$$

Addresses of Machinery and Raw Material Suppliers

1. M/s. Pacific Welding Alloys Mfg. Co.
   310, North Avenue, 21,
   Los Angles, 31,
   California, USA.
2. M/s. Moslo Manufacturing Co.
   OHIO, USA.
3. M/s. Machine Tools England
   Through Machine Tools India (P) Ltd.
   Kolkata.
4. M/s. Special Machines
   Karnal, Haryana.
5. M/s. Weld Crafts (P) Ltd.
   84/1, Richman Road,
   Bangalore.

Addresses of Raw Material Components and Spare Suppliers

1. M/s. Steel Authority of India Ltd.
2. M/s. Sooraj Trading Corporation
   Bhagirathpura,
   Indore.
3. M/s. Bengal Ferro-Alloy and Steel Ltd.
   8, Chitranjan Avenue,
   Kolkata-13.
4. M/s. F.X.P. Minerals
   Chavara (Via Quilon),
   Kerala.
5. M/s. Mysore Iron and Steel Ltd.
   Bhadravati,
   Jamshedpur.