



Pre-Feasibility Study

(Ferrocement Manhole Covers Developed Through R & D by CWHR)

**Council For Works & Housing Research,
F-40, Hub River Road, S.I.T.E, Karachi.
Tel # 021-99238243, 021-32577236,
Fax # 32577235**

*Note: All Services / information related to PM's Youth Business Loan are Free of Cost
March, 2014*

1. DISCLAIMER

In this document, we provide the information regarding the subject matter. The material of whole document is based upon the data and information collected from various reliable sources which may differ from case to case. The information has been provided on 'as is where is' basis without any warranties or assertions as to the correctness or soundness thereof. Council For Works & Housing Research, its employees do not assume any liability for any financial or other loss resulting from this memorandum in consequence of undertaking this activity. The contained information does not preclude any further professional advice. The prospective user of this memorandum is encouraged to carry out additional diligence and gather any information which is necessary for making an informed decision, including taking professional advice from a qualified consultant / technical expert before taking any decision to act upon the information.

2. PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to facilitate potential investors to invest in production of Ferrocement Manhole Covers by providing them a general understanding of the business with the intention of supporting potential investors in crucial investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business set-up and it's successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form basis of any Investment Decision.

3. INTRODUCTION TO CWHR, KARACHI.

Council for Works & Housing Research (CWHR) is an organization under the aegis of Ministry of Science and Technology. Its main function is to initiate & promote scientific research on problems related to all types of civil engineering structures with special thrust on economizing the cost of construction. CWHR has developed commercially viable techniques for production of Ferrocement Manhole Covers (FCMC).

4. EXECUTIVE SUMMARY

Construction Industry of Pakistan, is one of the largest industry which gives employment to hundreds of allied industries and also contribute significantly in the development of the country.

The progress of the any country can be determined with the quality and size of the construction industry. Pakistan Construction Industry includes Government Developing Agencies, Private Builders, Construction Consultant, Architect and local Civil Engineering Contractors.

Pakistan due to its vast natural resources, land and the production of large quantities of cement and steel is one of the favorite's countries in the world for International as well as National Builders and Developers. Recently many international Construction companies arrived in Pakistan market for taking part and doing business in this sector.

Construction Industry is contributing significantly to the national exchequer. Pakistan Market is highly attractive to International Builders and Developers due to low investments as compared to other countries, easy availability of quality construction material and cheap availability of skilled labor. These are some of the encouraging factors that provide a potent opportunity for a new entrant to venture into construction industry in Pakistan.

The proposed Ferrocement Manhole Covers production involves a total investment of about Rs. 2.0 Million approximately. The project will generate direct employment opportunity for 5-10 persons. Higher return on investment and a steady growth of business is expected with the entrepreneur having some prior experience or technical knowledge in the related field of business. This pre-feasibility encompasses essential information regarding various aspects of starting a Ferrocement Manhole Covers manufacturing business in Pakistan.

5. INTRODUCTION TO SCHEME

Prime Minister's 'Youth Business Loan', for young entrepreneurs, with an allocated budget of Rs. 5.0 Billion for the year 2013-14, is designed to provide subsidized financing at 8% mark-up per annum for one hundred thousand (100,000) beneficiaries, through designated financial institutions, initially by the National Bank of Pakistan (NBP) and the First Women Bank Ltd. (FWBL).

Loans from Rs. 0.1 million to Rs. 2.0 million with tenure up to 8 years inclusive of 1 year grace period, and a debt: equity of 90: 10 will be disbursed to SME beneficiaries across Pakistan, covering; Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, Gilgit Baltistan, Azad Jammu & Kashmir and Federally Administered Tribal Areas (FATA).

6. BRIEF DESCRIPTION OF PROJECT & PRODUCT

Manhole covers are generally used for covering inspection chambers both for water supply and sewerage lines that run as a network in the cities. Many fatal incidents have occurred due to the unscrupulous behavior of anti-social elements who steal the manhole covers for the value of reinforced bars or the cast iron material.

This is hazard to life as well as loss of millions of rupees to the civic agencies. In order to overcome this problem, CWHR has conducted extensive R&D work over the past two decades on ferrocement technology and has developed ferrocement manhole covers as an economical alternative to conventional RCC and Cast Iron manhole covers.

The market demand for manhole covers exists both in the public and private sector organizations. The largest market is with public health departments, building and roads departments, municipalities, town committees, builders and developers and etc.

7. CRITICAL FACTORS

- Locally available low quality Manhole Covers.
- Lack of awareness, marketing and advertising of the product in public sector.
- Higher return on investment and a steady growth of business is closely associated with technical expertise, higher production of Manhole Covers in less time, quality material and cost cutting measures for the entrepreneur.
- Price and Quality is the key factor, higher prices make the quality products less reachable as compare to cheap and low grade products.
- Prior experience and related technical expertise in the construction industry will increase the chances of profitability many folds.
- Strict compliance for the quality of product as per International standards for making quality Ferrocement Manhole Covers, which can bear the heavy load of transport in the roads.

8. INSTALLED & OPERATIONAL CAPACITIES

See the number 12 (PROJECT COST SUMMARY)

9. GEOGRAPHICAL POTENTIAL FOR INVESTMENT

Karachi, Hyderabad, Sukkar, Larkana, Lahore, Faisalabad, Gujranwalla, Multan, Rawalpindi, Quetta, Peshawar are the key cities, where the development work is going on and all the civic agencies as well as private developers of housing societies required quality manhole covers in

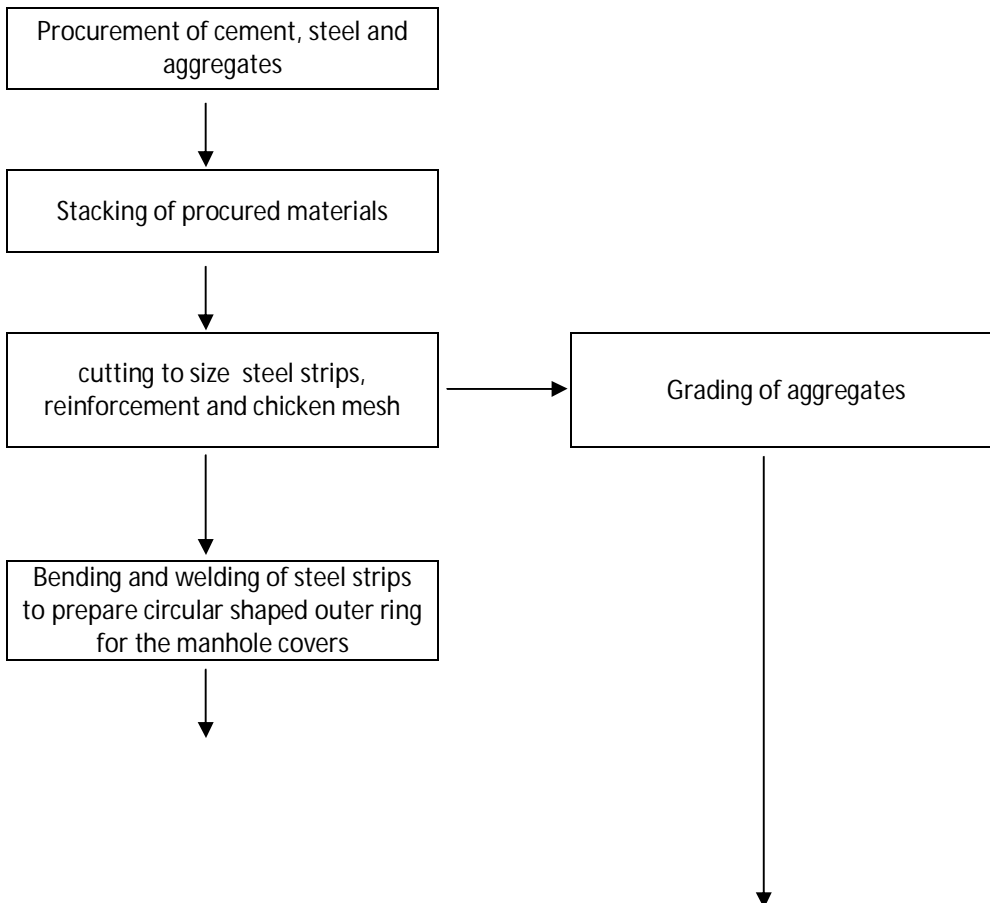
large quantities. Production platform can be established in the suburbs / periphery areas of these cities.

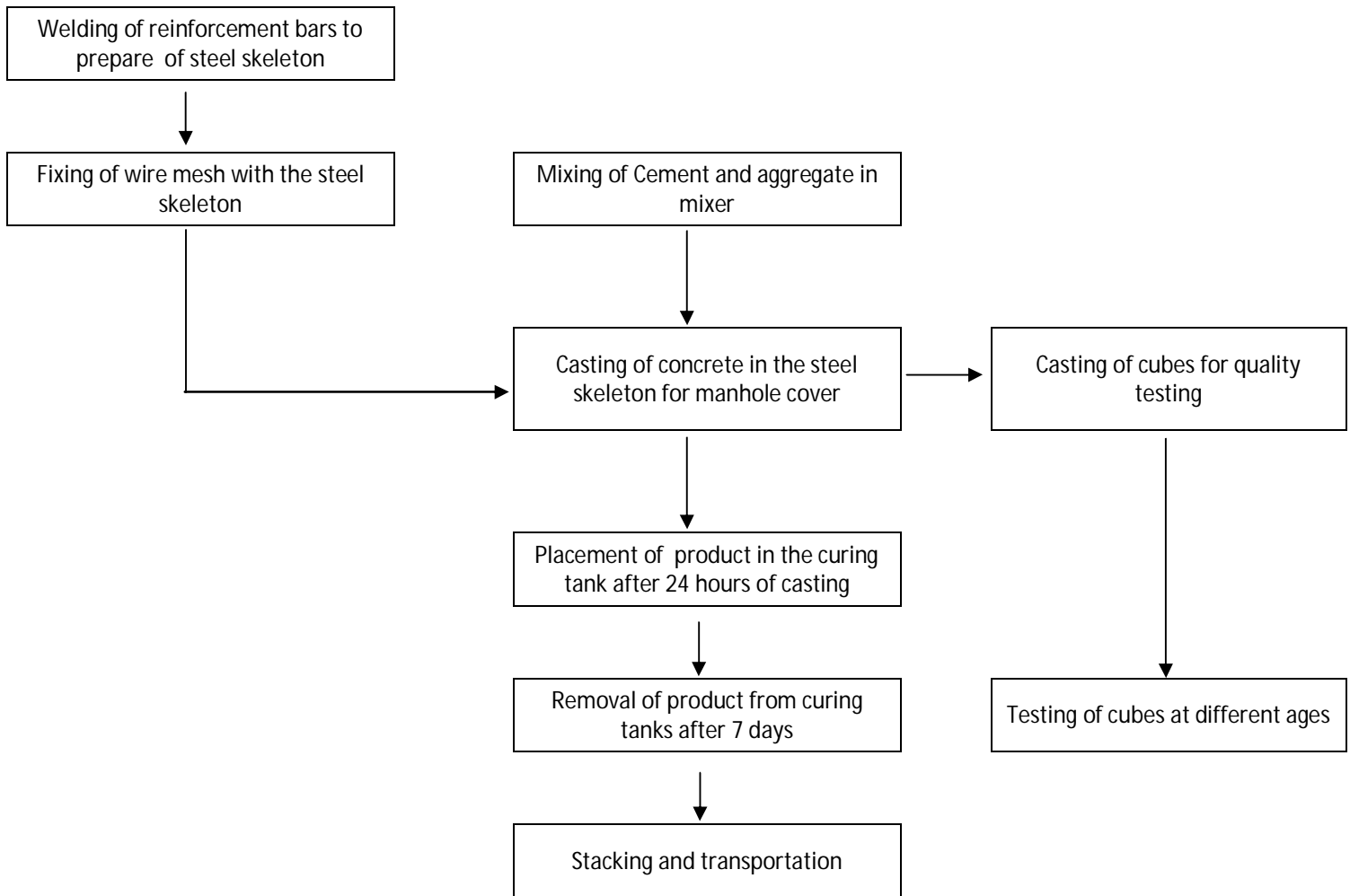
10. POTENTIAL TARGET MARKETS

Local Civic Agencies of the cities like;

- City District Government Karachi.
- Malir Development Authority, Karachi.
- Lyari Development Authority
- Defense Housing Authority, Karachi, Lahore, Islamabad
- Clifton Cantonment Board, Karachi.
- Town Administration, Karachi Metropolitan Corporation (KMC).
- Hyderabad Development Authority.
- Lahore Development Authority.
- Faisalabad Development Authority
- Gujranwala Development Authority
- Rawalpindi Development Authority.
- Capital Development Authority, Islamabad.
- Peshawer Development Authority.
- Quetta Development Authority
- All private Builders and Developers of housing societies etc.

11. PRODUCTION PROCESS FLOW





12. PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of Ferrocement Manhole Covers production under the 'Prime Minister's Youth Business Loan' scheme. Various cost and revenue related assumptions along with results of the analysis are outlined in this section.

Financial Analysis

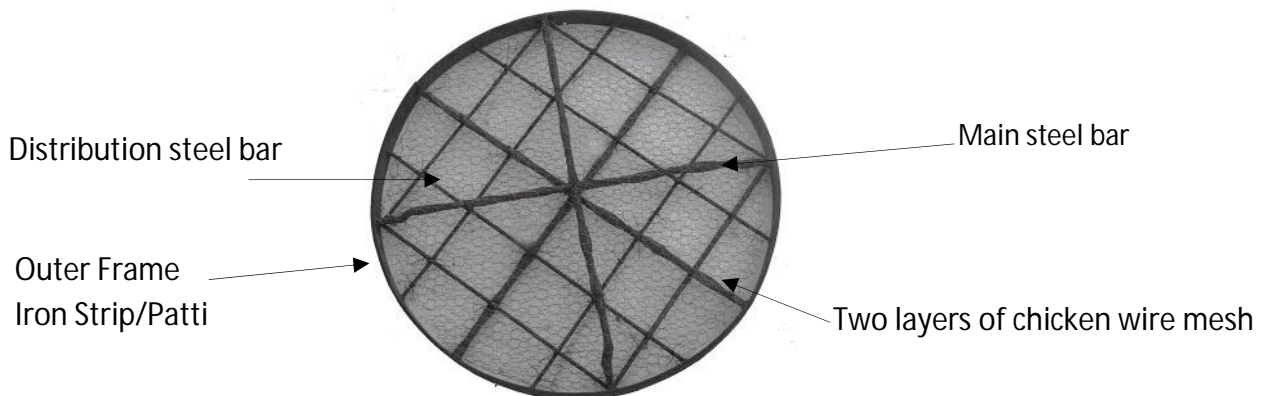
Financial analysis has been based on the following parameters:

- Production capacity: 200 manhole covers per day
- Open space for casting and stacking 3,000 SFT
- Covered Storage area and shed 1,500 SFT
- Water Curing Tanks (25' x 15' x 6') 15,000 Gallon
- Machinery as per Table 5

Summary of Cost per unit (excluding cost of space, POL, electricity and water)

S. No	FCMC Type	Unit Rate (Rs.) for Medium Load			Unit Rate (Rs.) For Heavy Load		
		Material	Labour	Total	Material	Labour	Total
1	Type 1	600	125	725	800	125	925
2	Type 2	650	125	775	850	125	975
3	Type 3	620	130	750	880	130	1,010
4	Type 4	670	140	810	900	140	1,040
5	Type 5	700	150	850	1,050	150	1,200
6	Type 6	800	170	970	1,150	170	1,320
7	Type 7	950	190	1,140	1,150	190	1,340
8	Type 8	1,150	230	1,380	1,400	230	1,630

A typical sketch of Ferrocement Manhole Covers



Ferrocement manhole covers (FCMC), designed and developed by CWHR are available in different sizes/shapes for light, medium and heavy loads that can be fabricated as per requirements. Details are as follows:

FCMC TYPE 1:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
• Diameter: 21"	Flat Iron Outer Frame	2"width 1/8" thick	2" width 3/16" thick
• Thickness at periphery :2"	Main Steel	4 No's 3/8" diameter	4 No's 1/2" diameter
• Thickness at Centre: 3½"	Distribution Steel	8 No's 1/8" diameter	8 No's 3/16" diameter
• Concrete Mix Ratio:(1:1:2)	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

FCMC TYPE 2:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
• Diameter: 22"	Flat Iron Outer Frame (Grade-40)	2"width 1/8" thick	2" width 3/16" thick
• Thickness at periphery :2"	Main Steel (Grade-60)	4 No's 3/8" diameter	4 No's 1/2" diameter
• Thickness at Centre: 3½"	Distribution Steel (Grade-40)	8 No's 1/8" diameter	8 No's 3/16" diameter
• Concrete Mix Ratio:(1:1:2)	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

FCMC TYPE 3:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
<ul style="list-style-type: none"> Diameter: 23 ½" 	Flat Iron Outer Frame (Grade-40)	1½" width 1/8" thick	1½" width 3/16" thick
<ul style="list-style-type: none"> Thickness at periphery :1½ " 	Main Steel (Grade-60)	4 No's 3/8" diameter	4 No's 1/2" diameter
<ul style="list-style-type: none"> Thickness at Centre: 2½ " 	Distribution Steel (Grade-40)	8 No's 1/8" diameter	8 No's 3/16" diameter
<ul style="list-style-type: none"> Concrete Mix Ratio:(1:1:2) 	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

FCMC TYPE 4:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
<ul style="list-style-type: none"> Diameter: 23 ½" 	Flat Iron Outer Frame (Grade-40)	2" width 1/8" thick	2" width 3/16" thick
<ul style="list-style-type: none"> Thickness at periphery :2 " 	Main Steel (Grade-60)	4 No's 3/8" diameter	4 No's 1/2" diameter
<ul style="list-style-type: none"> Thickness at Centre: 3½ " 	Distribution Steel (Grade-40)	8 No's 3/16" diameter	8 No's 1/4" diameter
<ul style="list-style-type: none"> Concrete Mix Ratio:(1:1:2) 	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

FCMC TYPE 5:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
• Diameter: 24"	Flat Iron Outer Frame (Grade-40)	2" width 1/8" thick	2" width 3/16" thick
• Thickness at periphery :2 "	Main Steel (Grade-60)	4 No's 3/8" diameter	4 No's 1/2" diameter
• Thickness at Centre: 3½"	Distribution Steel (Grade-40)	8 No's 3/16" diameter	8 No's 1/4" diameter
• Concrete Mix Ratio:(1:1:2)	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

FCMC TYPE 6:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
• Diameter: 24"	Flat Iron Outer Frame (Grade-40)	2½" width 1/8" thick	2½" width 3/16" thick
• Thickness at periphery :2½"	Main Steel (Grade-60)	4 No's 3/8" diameter	4 No's 1/2" diameter
• Thickness at Centre: 3½"	Distribution Steel (Grade-40)	8 No's. 3/16" diameter	8 No's 1/4" diameter
• Concrete Mix Ratio:(1:1:2)	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

FCMC TYPE 7:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
• Diameter: 25 ½"	Flat Iron Outer Frame (Grade-40)	2"width 3/16" thick	2" width 3/16" thick
• Thickness at periphery :2 "	Main Steel (Grade-60)	4 No's 1/2" diameter	4 No's 1/2" diameter
• Thickness at Centre: 3½"	Distribution Steel (Grade-40) for medium (Grade-60) for Heavy	8 No's 1/4" diameter	8 No's 3/8" diameter
• Concrete Mix Ratio:(1:1:2)	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

FCMC TYPE 8:

Description	Major Components	Reinforcement Details	
		For Medium Load	For Heavy Load
• Diameter: 26"	Flat Iron Outer Frame (Grade-40)	2"width 3/8" thick	2" width 3/8" thick
• Thickness at periphery :2 "	Main Steel (Grade-60)	6 No's 1/2" diameter	6 No's 1/2" diameter
• Thickness at Centre: 3½"	Distribution Steel (Grade-40) for medium (Grade-60) for Heavy	8 No's 1/4" diameter	8 No's 3/8" diameter
• Concrete Mix Ratio:(1:1:2)	Hexagonal Wire Mesh	2 layers 28 gauge	2 layers 28 gauge

12.1 Project Economics

Production capacity 200 manhole covers per day.

The following table shows internal rate of return, payback period and Net Present Value;

Table 1: Project Economics

Description Details

Internal Rate of Return (IRR) %

Payback Period (yrs) ---
Net Present Value (NPV) ---

12.2 Project Financing

Following table provides details of the equity required and variables related to bank loan;

Table 2: Project Financing

Description Details

Total Equity (10%) Rs. 2,00,000/=
Bank Loan (90%) Rs. 18,00,000/=
Markup to the Borrower(%age/annum) 8%
Tenure of the Loan (Years) 8
Grace Period (Year) 1

12.3 Project Cost

Following requirements have been identified for the operation of the proposed business. A rental premise has been recommended for this project.

Table 3: Project Cost

Capital Investment Amount (Rs.)

Machinery (Capital Cost)

For Production Capacity: 200 manhole covers per day

S. No	Name of Equipment	Quantity	Cost In Rs. Million
1	Concrete Mixer Machine for 10.5 Cft	01	0.35
2	Roller Bending Machine	02	0.30
3	Press Steel Cutter Machine with accessories	01	0.25
4	Welding Machine with accessories	05	0.25
5	Disk Cutter Machine	02	0.10
6	Vibrating Table	04	0.20
7	Hand Vibrator	02	0.15
8	Generator 10KVA (Diesel/Petrol operator)	01	0.20
9	Office Furniture / Office Equipments		0.20
Total Cost			2.0

Total Capital Cost: 2 Million (Rupees)

12.4. Space Requirement

The area has been calculated on the basis of space requirement for platform, management, storage and water curing tank. However, the units operating in the industry do not follow any set pattern. Following table shows calculations for project space requirement.

Space Requirement in SFT

1) Open space for casting and stacking	3,000 SFT
2) Covered Storage area and shed	1,500 SFT
3) Water Curing Tanks (25' x 15' x 6')	15,000 Gallon

Premises will be obtained on rent @ Rs. 10,000-20,000 per month.

12.5 Machinery and Equipment

Following table provides list of machinery and equipment required for production of Ferrocement Manhole Covers from raw material to finish product.

Table 5: Machinery & Equipments

1) Concrete Mixer Machine for 10.5 Cft
2) Roller Bending Machine
3) Press Steel Cutter Machine with accessories
4) Welding Machine with accessories
5) Disk Cutter Machine
6) Vibrating Table
7) Hand Vibrator
8) Generator 10KVA (Diesel/Petrol operator)

Note: The cost may vary at the time of purchase.

12.6 Furniture & Fixture

Following furniture and fixture will be required for the small office near platform of the production for sitting of clients and for marketing of the product:

Table 6: Furniture & Fixture

Details Quantity Cost Amount (Rs.)

Office / Visitor Chairs 6 x 6,000 = 36000/=

Office Tables 2 x 10,000= 20000/=

Fans (Pedestal and Ceiling) 5x 3,500 = 17,500/=

Total Rs. 73,500/=

12.7. Office Equipment

Office equipment comprises of necessary IT equipment items.

Table 7: Office Equipment

Office equipment can be purchased later on as per their need time to time.

Details Quantity Cost Amount

Computer laptop 1x 65,000 = 65,000/=

Computer desktop (used) 1x 35,000= 35,000/=

Computer printer 2 x18,000 = 18,000/=

Flat bed scanner 1x 10,000 = 10,000/=

Networking 1 x 5000 = 5000/=

Telephone 1 x 1,500 = 1,500/=

Total Rs. 1,34,500/= (Approx)

12.8 Raw Material Requirements

The raw materials are easily available in local market. Raw material requirements depending upon the production planning of the Ferrocement Manhole Covers or depending upon order of the client.

Table 8: Cost of Materials

Unit Rate (Rs.)

Cement 50 kg beg = Rs. 550/= (As per requirement / order)

Steel Bars 80,000 per ton (As per requirement / order)

Electricity & Water as per requirement

12.9 Human Resource Requirement

Following table provides details of human resource required for this venture:

Table 9: Human Resource Requirement

Description No. of Employees Salary per piece manhole cover (Rs.)

Mistri and labour charges for curing of manhole cover Rs. 200/= per manhole cover

Total Staff (Depending Upon Order). Total Contract Expense = (Depending Upon Order)

Contract for per piece curing of manhole covers can be changed with the time depending upon market condition.

12.10 Revenue Generation

Table 10: Revenue Generation

Product Sales Price

(Rs./Unit) For Different Sizes of Manhole Covers

Rs. 2500/= per manhole cover to Rs. 4500/= per manhole cover depend upon size

First Year Sales Revenue (Rs)

Rs. 2,500 per manhole cover x 5,000 manhole covers * Approx 11.25 Million*

* As per demand

13. CONTACT DETAILS

The Secretary

Council For Works & Housing Research,
F- 40, Hub River Road, S.I.T.E, Karachi.

Tel# 021- 99238243 / 32577236 Fax: 32577235