

PROJECT PROFILE ON FLY ASH BRICKS

1. Product : Fly Ash Bricks
2. Quality Standards : IS : 12894 :2002
3. Production Capacity quantity : 24 lakh bricks
Value : Rs. 78 lakhs
4. Month & Year : March 2011
5. Prepared by : MSME-DI, Guindy,
Chennai.

1. INTRODUCTION :

Pulverized fuel ash commonly known as fly ash is a useful by-product from thermal power stations using pulverized coal as fuel and has considerable pozzolonic activity. This national resource has been gainfully utilized for manufacture of pulverized fuel ash-lime bricks as a supplement to common burnt clay buildings bricks leading to conservation of natural resources and improvement in environment quality.

Pulverized fuel ash-lime bricks are obtained from materials consisting of pulverized fuel ash in major quantity, lime and an accelerator acting as a catalyst. Pulverized fuel ash-lime bricks are generally manufactured by intergrading blending various raw materials are then moulded into bricks and subjected to curing cycles at different temperatures and pressures. On occasion as and when required, crushed bottom fuel ash or sand is also used in the composition of the raw material. Crushed bottom fuel ash or sand is also used in the composition as a coarser material to control water absorption in the final product. Pulverized fuel ash reacts with lime in presence of moisture from a calcium hydrate which is a binder material. Thus pulverized fuel ash – lime in presence of moisture form a calcium – silicate hydrate which is binder material. Thus pulverized fuel ash – lime brick is a chemically ended bricks.

These bricks are suitable for use in masonry construction just like common burnt clay bricks. Production of pulverized fuel ash-lime bricks has already started in the country and it is expected that this standard would encourage production and use on mass scale. This stand lays down the essential requirements of pulverized fuel ash bricks so as to achieve uniformity in the manufacture of such bricks.

The Proposed unit will be a started by one of the women entrepreneur and she have acquired EM Part I from the District Industries Centre, Kanchipuram, And also obtained all the statutory requirements to run the firm without any technical and managerial problems.

2. MARKET DEMAND:

180 billion tones of common burnt clay bricks are consumed annually approximately 340 billion tones of clay- about 5000 acres of top layer of soil dug out for bricks manufacture, soil erosion, emission from coal burning or fire woods which causes deforestation are the serious problems posed by brick industry. The above problems can be reduced some extent by using fly ash bricks in dwelling units.

Demand for dwelling units likely to raise to 80 million units by year 2015 for lower middle and low income groups, involving an estimated investment Of \$670 billion, according to the Associated chamber of commerce and industry. Demand for dwelling units will further grow to 90 million by 2020, which would requires a minimum investment of \$890 billion. The Indian housing sector at present faces a shortage of 20 million dwelling units for its lower middle and low income groups which will witness a spurt of about 22.5 million dwelling units by the end of Tenth plan period. There is ample scope for fly ash brick and block units.

In Chennai alone 1 crore bricks are required for constructional activities in every day. But good quality of bricks as well as required quantity are not available moreover during the rainy seasons supply of clay bricks are very difficult. Therefore, in order to fulfill the required demand there will be a great chance to start more units in the field of fly ash bricks.

At present 20nos units are engaged and 40 lakhs nos of bricks per month are manufactured in our state. And there will be scope to start near about **100 units**, which will be produced more than 2 cores no of bricks per month in future. Thus marketing of these product are well shinning.

3. BASIS AND PRESUMPTION OF THE PROJECT:

- i. The process of manufacture is on the basis of single shift of six hours per day with three hundred working days in a year.
- ii. To achieve full plant capacity it requires! year after trial production
- iii. Labor and wages mentioned in profile are as per prevailing local rates.
- iv. Interest rate at 12.5% considered in the project
- v. However the rate of interest may be varying while implementing project.
- vi. The Promoter contribution will be 5% of the total project cost which applicable in the PMEGP scheme.
- vii. The capacity of the unit 8000 bricks per day on the single sift basis.

4.RAW MATERIALS

Fly Ash is the inorganic mineral residue obtained after burning of coal/lignite in the boilers. Fly Ash is that portion of ash which is collected from the hoppers of ESP's and pond ash is collected from the ash ponds. Bottom ash is that portion of ash which can be collected from the bottom portion of the boilers. The characteristics of fly ash depend upon the quality of lignite/coal and the efficiency of boilers.

India depends upon primarily on coal for the requirement of power and her power generation is likely to go up from 60,000MW in the year 2010. While generation of power from bituminous sources is on increase. The generation of fly ash is also likely to increase. The fly ash generation in India Thermal Stations is likely to shoot up to 170 million tones in 2010 from the present level of 100 million tones. The disposal of fly ash in the present method will be a big challenge to environment, especially when the quantum increases from the present level.

The proposed unit will be using both type of fly ash depends upon the availability

4.a Characteristics of Fly ash

The physical and chemical properties of Fly Ash are tabulated below

4.a. i. Physical Properties

Specific Gravity	2.54 to 2.65 gm/cc
Bulk Density	1.12 gm/cc
Fineness	350 to 450 M ₂ /Kg

4.a. ii. Chemical Properties

Silica	35-59 %
Alumina	23-33%
Calcium Oxide	10-16%
Loss on ignition	1-2%
Sulphur	0.5- 1.5%
Iron	0.5- 2.0 %

It may be seen that lignite fly ash is characterized primarily by the presence of silica, alumina, calcium etc.

Presence of silica in fine form makes it excellent pozzolanic material. Its abundant availability at practically nil cost gives a very good opportunity for the construction agencies.

4.b. Characteristics of Lignite and Coal Fly Ash:

CONTENTS	LIGNITE FLY ASH (%)	COAL FLY ASH (%)
L.O.I	1.0 TO 2.0	3-15
SiO ₂	45.59	40-64
Al ₂ O ₃	23-33	15-29
Fe ₂ O ₃	06-4.0	2-11
CaO	5.0-16.0	0.1-1.0
MgO	1.5-5.0	0.2-4.0
So ₃	0-5. 0	0.1-1.7

About 50 to 80% fly ash may be used for the production. Fly ash conform to IS 3812/1981 is one of the important aspects.

4.c. GUPSUM:

Hydrated calcium sulphate are called gypsum. ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). Gypsum should have minimum 35% purity and 5 to 15% may be used.

4.d Lime :

Quick Lime or hydrated lime or both can be mixed in the composition. Lime should have minimum 40% CaO content.

4.e. Sand

River sand should be clean & coarse. About 10 to 20% may used.

All the raw materials are indigenous and readily available from the manufacture or traders

5. MANUFACTURING PROCESS:

Fly ash (70%) Lime (10%) Gypsum (5%) and sand(15%) are manually feed into a pan mixer where water is added to the required proportion for homogeneous mixing. The proportion of raw material may vary depending upon quality of raw materials. After mixing, the mixture are allowed to belt conveyor through feed in to automatic brick making machine where the bricks are pressed automatically. Then the bricks are placed on wooden pallets and kept as it is for two days there after transported to open area where they are water cured for 10 -15 days. The bricks are sorted and tested before dispatch.

6. FLOW SHEET DIAGRAM



7. INSPECTION AND QUALITY CONTROL :

The Bureau of Indian Standards has formulated and published the specifications for maintaining quality of product and testing purpose. IS : 12894 :2002. Compressive strength achievable: 60-250 Kg/Cm.Sq. Water absorption: 5 – 12 %; Density: 1.5 gm/cc Co-efficient of softening (depending upon water consistency factor) Unlike conventional clay bricks fly ash bricks have high affinity to cement mortar though it has smooth surface, due to the crystal growth between brick and the cement mortar the joint will become stronger and in due course of time it will become monolithic and the strength will be consistent.

8. PRODUCTION CAPACITY PER ANNUM:

Quantity: 24 lakh bricks total value Rs. **78,00,000/**

Motive Power required: 35 HP

9. POLLUTION CONTROL

The technology adopted for making fly ash bricks is eco-friendly. It does not require steaming or auto-calving as the bricks are cured by water only. Since firing process is avoided. There are no emissions and no effluent is discharged. Facial masks and dust control equipment may be provided to the employees to avoid dust pollution more over all the raw materials are kept under covered by polythene sheet to avoid air pollution.

10. ENERGY CONSERVATION:

General precautions for saving electricity are followed by the unit by providing energy meter. This products are low energy consumption since no need of fire operation in the production unlike conventional bricks. Thus considerable energy could be saved not only in manufacturing activities but also during the construction.

11. Electrical HP Details:

Sl No	Name of the Machine	No: of m/s	H.P Connected
1	Automatic Fly Ash Brick making machine	1	12
2	Pan Mixer 7.5 + 7.5	2	15
3	Belt Conveyor	1	2
4	Other electrical fittings/ lighting etc	--	6
Total H.P Connected			35

12. FINANCIAL ASPECTS**12.1. FIXED CAPITAL :**

(a) Land & Building:

S.N	DESCRIPTION	AMOUNT Rs
1	Land Lease hold	45,000 Sq.f
2	Building (60 x 40 = 2400 Sq. feet.)	3,00,000
3	Overhead water tank	50,000
	TOTAL	3,50,000

(b) Machinery and Equipment :

S.N	DESCRIPTION	QTY	RATE	AMOUNT
1	Automatic Fly ash Brick making machine hydraulic operated with all accessories and fitting with 18HP Motor	1	12,00,000	12,00,000
2	Pan Mixture 500 KG Capacity with 7.5 HP Motor	1	2,00,000	2,50,000
3	Belt Conveyor with necessary fittings and 2 HP Motor	1	50,000	50,000
	TOTAL			15,00,000
	VAT 4 %			60,000
	GRANT TOTAL			15,60,000
	Erecting and Electrification Charges			22,000
5	Office furniture			20,000
	TOTAL			16,02,000

13. RECURRING EXPENDITURE (PER MONTH) :**(a)Raw Material Per Month:**

Rs.

S.N	DESCRIPTION	QTY	RATE	AMOUNT
1	Fly ash	420 Mt	250	1,22,500
2	Gypsum Lime	70	1,900	1,33,000
3	Lime	105	1,300	1,36,500
4	Sand	35	800	28,000
	TOTAL			4,20,000

(b) Salaries & Wages Per Month :

Rs.

S.No	DESIGNATION	NO	SALARY	Amount
1	Production Manager	1	--	Self
2	Un skilled workers	22	3,750	82,500
3	Office assistant	1	4,000	4,000
4	Watch man	1	3,500	3,500
	Total	25		90,000

(c)Utilities Per Month :

Rs.

S.N	DESCRIPTION	AMOUNT
1	Power 35 HP 3916 Units@ Rs.5 per Unit	19,583.
2	Water	1,000
	TOTAL	20,583

(d)Other Expenses Per Month :

Rs.

S.N	DESCRIPTION	AMOUNT
2	Postage and stationery	1,000
3	Repairs and maintenance	3,000
4	Traveling and transportation	2,000
5	POL	5,000
6	Insurance	1,000
7	Telephone	3,000
	TOTAL	15,000

14. RECURRING EXPENDITURE PER MONTH:

$$a + b + c + d = \text{Rs. } 5, 45,583/- \text{ say Rs: } 5, 45,600$$

15. RECURRING EXPENDITURE FOR 3 MONTHS

$$5, 45,600 \times 3 = 16,36,800$$

16) WORKING CAPITAL ASSESSMENT

S.N	DESCRIPTION	AMOUNT
1	Raw Material (Required for one week)	1,17,600
2	Work in progress (Required for one month)	1,09,583
3	Finished Good (Required for 5 days)	1,05,917
4	Bill receivable (Required for two weeks)	2,06,900
	TOTAL	5,40,000

17. OTHER FINANCIAL ASSISTANCE Rs.**17. a. Total Project Cost**

a. Land	Lease hold
b. Building	3, 50,000
c. Plant & Machinery	16, 02,000
d. Working capital	<u>5, 40,000</u>
Total	<u>24,92,000</u>

17.b Means of Finance**Rs.**

Total Project cost	4,92,000
Promoter contribution 5%	<u>1,24,600</u>
Finance required from the Bank	<u>23,67,400</u>

Subsidy applicable under the PMEGP @ 35% 8,72,200/

17.c. Cost of Production Per Annum : Rs.

S.N	DESCRIPTION	AMOUNT
1	Total recurring cost	65,47,200
2	Interest on total investment @12.5%	3,11,500
3	Total Depreciation on Building @5%	15,000
4	Total Depreciation on Machinery equipments @ 10%	1,48,200
5	Total Depreciation on Office & furniture @ 20%	4,000
	TOTAL	70,25,900

17.d. Turnover Per Annum :

Excepted sale 24 lakh bricks @ 3.40 per bricks 81,60,000

17.e. Profit Per Annum :

$$\begin{array}{rcl} \text{Turnover} & - & \text{Cost of Production} \\ 81,60,000 & - & 70,25,900 \\ & = & \mathbf{11,34,100/-} \end{array}$$

$$\begin{aligned} \text{(a) \% of profit on sales} &= \frac{\text{Profit/annum} \times 100}{\text{Turnover}} \\ &= \frac{11,34,100 \times 100}{81,60,000} \\ &= \frac{11,34,10,000}{81,60,000} \\ &= \mathbf{13.90\%} \end{aligned}$$

$$\begin{aligned} \text{b) Rate of Return} &= \frac{\text{Profit/annum} \times 100}{\text{Total Capital investment}} \\ &= \frac{11,34,100 \times 100}{24,92,300} \\ &= \frac{11,34,10,000}{24,92,300} \\ &= \mathbf{45.50\%} \end{aligned}$$

18. Break Even Analysis:

(1) Fixed cost per annum:

a. Total Depreciation	=	1,67,200
b. Interest on investment	=	3,11,500
c. Insurance	=	4,800
d. 40% of salary and wages	=	4,32,000
e. 40% of other expenses & Utilities excluding Insurance	=	1,92,398
		=====
		11,07,898
		=====

(2) Profit per annum = Rs. 11.34,100/

$$\text{Break Even Point} = \frac{\text{Fixed Cost/annum} * 100}{\text{Fixed cost/annum} + \text{Profit/annum}}$$

$$= \frac{1107898 * 100}{1107898 + 1134100}$$

$$= \frac{1107898 * 100}{2241998}$$

$$= \mathbf{49\%}$$

Supplier's Address:

A. Raw Materials Supplier's :

- **Fly ash** - available from the Tamilnadu Power Stations Chennai, Tuticorin and Mattuor.
- **Gyp sum** - available from TANFAC SIPCOT Industrial Complex, Cuddalore,
- **Lime stone, river sand** and **crusher dust** are available from the local dealers.

B. Machinery and Equipments:

1. M/s. Machines and Engineering Company

No:385, 7th Street, Sanganoor Main Road,
Near Railway Gate, Rathinapuri, Coimbatore.
Phone: 0422- 2333872/2330248/23326553

2. M/s. Lakshmi and Company

No:30, Amman Kovil Street, Venkatapuram,
GCT Post, Coimbatore.
Phone:0422/2437208/2436129

3. M/s. Benny Industries

No:12, Thadagam Road, Near Agarwal School,
Somaiyampalayam Post, Coimbatore.
Phone: 0422/3232444/3231444