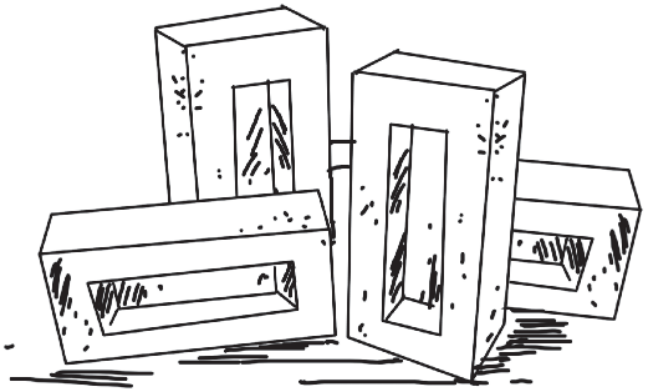
FLY ASH BRICKS



1.0 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. These bricks are suitable for use in masonary 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.

The fly ash bricks are comparatively lighter in weight and stronger than common clay bricks. Since fly ash is being accumulated as waste material in large quantity near thermal power plants and creating serious environmental pollution problems, its utilisation as main raw material in the manufacture of bricks will not only create ample opportunities for its proper and useful disposal but also help in environmental pollution control to a greater extent in the surrounding areas of power plants. In view of superior quality and eco-friendly nature and government support the demand for Fly Ash Bricks has picked up. The demand of bricks could be met by establishing small units near thermal power stations and to meet the local demand with less transportation costs.

This project profile is for setting up of a fly ash brick field unit with production capacity of 20 Lakhs Fly ash bricks based on 300 working days per annum and 8 working hours per day.

2.0 MARKET POTENTIAL

With the rise in population and increase in construction activities considering the improvement in the standard of living the demand for building bricks is increasing day by day. The country consumes about 180 billion tonnes bricks, exhausting approximately 340 billion tonnes of clay every year and about 5000 acres of top soil land is made unfertile for a long period. The Government is seriously concerned over soil erosion for production of massive quantities of bricks, in the background of enormous housing needs. Since 60% of country's electricity comes from coal based power station, the country has a huge stock of fly ash amounting to 60 million tones annually. Despite all the efforts present scenario is not too encouraging as only 5% of country's total ash has been consumed in different sectors. Considering the gravity of the situation of disposal of fly ash, which is hazardous, both the central and State Governments and R&D organizations have been constantly finding out appropriate means for best utilization of fly ash. As the production of building bricks in the state and country, falls far below the market demand due to increase in constructional activities the shortfall is likely to increase manifold. Hence there is a promising market potential for Fly Ash based building bricks, however, the quality and cost have to be maintained at par with the conventional red clay burnt building bricks.

3.0 PROCESS DETAILS

The production process comprises of the following different process.

Fly ash (70%) Lime (10%) Gypsum (5%) and sand(15%)

are manually fed 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.

Process involves the following stages of operations.

i) Proportioning and mixing of batch materials such as fly ash, lime, calcined gypsum, sand and water.
ii) Preparation of Bricks through moulds/ Shaping of bricks in the press.
iii) Drying of green bricks over wooden pallets.
iv) Curing of the bricks by spraying/sprinkling water for 10 to 15 days.
v) Sorting, inspection and quality control tests prior to sale.

4.0. COST OF THE PROJECT

The estimated project cost is given below:

(Rs. in lacs)

Particulars	Amount (Rs)
Land & site development	**Own Land/On Lease**
Building & civil works	**5.23**
Plant & Machinery	**19.25**
Misc. Fixed assets	**0.72**
Preliminary & pre-operative expenses	**2.03**
Contingencies & escalation @ 3%	**0.76**
Working capital	**2.10**
TOTAL	**30.08**

4.1 Land & Site Development: Nil.

Total Land: 2 Acres; Covered Area: 2,000 Sq. Ft.

4.2 Building & Civil Works: Details of building & civil works are given below.

Particulars	Area (Sqft)	Rate (Rs)	Amount (Rs)
Machinery Shed cum Office	1000	275	275000
Material Storage Shed	1000	200	200000
		Sub total	**475000**
Add: Electrification, water supply and sanitation @ 10%			47500
		TOTAL	**522500**
		Say (Rs. in lacs)	**5.23**

4.3 Plant & Machinery: Details of plant & machinery are given below.

Particulars	Qty	Rate (Rs)	Amount (Rs)
Automatic Fly Ash Brick Making Machine	1	1200000	1200000
Pan Mixer	1	250000	250000
Material Handling and Moulds	1	225000	225000
Belt Conveyor	1	50000	50000
Miscellaneous items	LS	--	25000
		Sub total	**1750000**
Add: Installation, transportation, etc @ 10%			175000
		TOTAL	**1925000**
		Say (Rs. in lacs)	**19.25**

4.4 Misc. Fixed assets: Details of miscellaneous fixed assets are given below.

Particulars	Qty	Rate (Rs)	Amount (Rs)
Transformer	1	200000	200000
Fixtures and Fittings	1	40000	40000
Furniture	LS	–	15000
Miscellaneous items	LS	–	10000
		Sub total	**65000**
Add: Installation, transportation, etc @ 10%			6500
		TOTAL	**71500**
		Say (Rs. in lacs)	**0.72**

4.5 Contingencies & escalation: Contingencies & escalation has been assumed at 3% of the cost of land & site development, building & civil works, plant & machinery and miscellaneous fixed assets.

4.6 Preliminary & pre-operative expenses: Details of preliminary & pre-operative expenses are given below.

(Rs. In lacs)

Particulars	Amount (Rs)
Travelling expenses	10000
Professional & other fees	44000
Interest during implementation	99330
Miscellaneous expenses	50000
TOTAL	203330
Say (Rs. in lacs)	**2.03**

4.7 Working capital: Details of working capital are given below.

(Rs. in lacs)

	Period (Days)	Total Current Assets		
		Year 1	Year 2	Year 3
Raw materials	30	1.69	1.97	2.25
Power & Utility	30	0.12	0.14	0.17
Salary	30	0.69	0.69	0.70
Finished Goods	15	1.27	1.43	1.58
Receivables	15	1.48	1.73	1.97
Total		**5.26**	**5.96**	**6.67**
Working capital margin in Year 1 (40%)	**2.10**			

5.0 MEANS OF FINANCE

The means of finance for the project is estimated as below.

(Rs. in lacs)

Particulars	Percent	Amount
EQUITY		
A. Equity from Promoters	**40%**	**12.03**
B. Subsidy from Central/State Govt.	**-**	
DEBT		
Term Loan from Banks/Financial Institutions	**60%**	**18.05**
TOTAL	**100%**	**30.08**

6.0 PROFITABILITY STATEMENT

(Rs. in lacs)

Particulars	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
A. INCOME							
Production capacity (Nos./ annum)	2000000	2000000	2000000	2000000	2000000	2000000	2000000
Capacity utilisation	60%	70%	80%	80%	80%	80%	80%
Production/ annum at capacity	**1200000**	**1400000**	**1600000**	**1600000**	**1600000**	**1600000**	**1600000**
utilisation							
Price of Fly-ash Bricks (Rs/Piece)	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Total income/ annum	**36.00**	**42.00**	**48.00**	**48.00**	**48.00**	**48.00**	**48.00**
B. OPERATING EXPENSES							
Raw materials	20.53	23.95	27.38	27.38	27.38	27.38	27.38
Power & utility	1.51	1.76	2.01	2.01	2.01	2.01	2.01
Salary	8.40	8.44	8.48	8.53	8.57	8.61	8.66
Repair & Maintenance	0.45	0.46	0.47	0.48	0.48	0.49	0.50
Other Expenses	0.11	0.13	0.14	0.14	0.14	0.14	0.14
Total Operating Expenses	**31.00**	**34.74**	**38.48**	**38.54**	**38.59**	**38.64**	**38.69**
Operating profit	**5.00**	**7.26**	**9.52**	**9.46**	**9.41**	**9.36**	**9.31**
C. FINANCIAL EXPENSES							
Depreciation	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Interest on Term Loan	1.44	1.33	1.09	0.85	0.61	0.37	0.13
Interest on Working Capital Loan	0.25	0.29	0.32	0.32	0.32	0.32	0.32
Net Profit	**2.07**	**4.40**	**6.87**	**7.06**	**7.24**	**7.43**	**7.62**
Net cash accruals	**3.31**	**5.64**	**8.10**	**8.29**	**8.48**	**8.67**	**8.86**
Principal Repayment	0.00	3.01	3.01	3.01	3.01	3.01	3.01

6.1 Production capacity: Total production of **Fly-ash Bricks** at 100% capacity utilization is estimated as below.

No. of Fly-ash Bricks/annum	2000000 Nos.
Total production per annum at 100% capacity (Nos)	**2000000 Nos.**

6.2 Raw materials: Total expenses on raw materials at 100% capacity utilization are estimated as below.

Particulars	Qty Reqd	Price per Unit (In Rs.)	Amount (Rs.)
Fly Ash	3000 Ton	9500	2850000
Gypsum	850 Ton	3200	272000
Lime	1200 Ton	2500	300000
Expenses on raw material at 100% capacity (Rs)			3422000

6.3 Power & Utility: Total expenses on power & utility at 100% capacity utilization is estimated as below.

Particulars	Quantity	Power (Kw)	Total (Kw)
Plant & machinery (Total HP of 35)	--	26.11	26.11
General Lighting	10	0.10	1.00
Total power requirement/ day (Kw)			27.11

No. of hrs/day	8
Nos. of days/annum	300
Annual power requirement (kwh)	65064
Rate per unit (Rs)	3.50
Expenses on power (Rs)	227724
B: Estimate of Utility	
Expenses on other Utility (Rs)	24000
Expenses on power & Utility at 100% capacity (Rs)	**251724**

6.4 Salary: Total expenses on salary in the 1st year are estimated as given below. It is assumed that salary expenses will increase @ 0.5% every subsequent year.

Particulars of Employees	Numbers	Salary/ Month (Rs)	Cost/annum (Rs)
Manager	1	10000	120000
Kiln Operator	2	5000	120000
Skilled workers	5	4000	240000
Unskilled workers (On contract)	10	3000	360000
Expenses on salary in the 1st year (Rs)			**840000**

6.5 Repair & Maintenance: Total expenses on repair & maintenance in the 1st year is estimated as given below. It is assumed that expenses on repair & maintenance will increase @ 2% every subsequent year.

(Rs. in lacs)

Particulars	Cost (Rs)	Rate	Amount (Rs)
Building & civil works	5.23	1.00%	0.05
Plant & Machinery	19.25	2.00%	0.39
Misc. Fixed assets	0.72	1.50%	0.01
Expenses on repair & maintenance in year 1			**0.45**

6.6 Other Expenses: Other expenses have been assumed at 0.3% of sales realisation.

6.7 Depreciation: Depreciation has been calculated by straight line method. The details of calculation are given below.

(Rs in lacs)

Description	Cost (Rs)	Rate	Amount/ annum (Rs)
Building & civil works	5.23	3.34%	0.17
Plant & Machinery	19.25	5.28%	1.02
Misc. Fixed assets	0.72	6.33%	0.05
TOTAL			**1.24**

6.8 Interest on term loan & principal repayment: Interest rate has been assumed at 8%. Duration of Loan repayment has been considered for a period of 7 years including moratorium period of 1 year with equal monthly instalments. The details of calculation are given below.

(Rs in lacs)

Month	Year	1	2	3	4	5	6	7
Month 1	Opening balance	18.05	18.05	15.04	12.03	9.02	6.02	3.01
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest (8%)	0.12	0.12	0.10	0.08	0.06	0.04	0.02
	Closing balance	**18.05**	**17.80**	**14.79**	**11.78**	**8.77**	**5.77**	**2.76**
Month 2	Opening balance	18.05	17.80	14.79	11.78	8.77	5.77	2.76
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.12	0.10	0.08	0.06	0.04	0.02
	Closing balance	**18.05**	**17.55**	**14.54**	**11.53**	**8.52**	**5.51**	**2.51**
Month 3	Opening balance	18.05	17.55	14.54	11.53	8.52	5.51	2.51
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.12	0.10	0.08	0.06	0.04	0.02
	Closing balance	**18.05**	**17.30**	**14.29**	**11.28**	**8.27**	**5.26**	**2.26**
Month 4	Opening balance	18.05	17.30	14.29	11.28	8.27	5.26	2.26
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.12	0.10	0.08	0.06	0.04	0.02
	Closing balance	**18.05**	**17.05**	**14.04**	**11.03**	**8.02**	**5.01**	**2.01**
Month 5	Opening balance	18.05	17.05	14.04	11.03	8.02	5.01	2.01
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.11	0.09	0.07	0.05	0.03	0.01
	Closing balance	**18.05**	**16.80**	**13.79**	**10.78**	**7.77**	**4.76**	**1.75**
Month 6	Opening balance	18.05	16.80	13.79	10.78	7.77	4.76	1.75
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.11	0.09	0.07	0.05	0.03	0.01
	Closing balance	**18.05**	**16.54**	**13.54**	**10.53**	**7.52**	**4.51**	**1.50**
Month 7	Opening balance	18.05	16.54	13.54	10.53	7.52	4.51	1.50
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.11	0.09	0.07	0.05	0.03	0.01
	Closing balance	**18.05**	**16.29**	**13.29**	**10.28**	**7.27**	**4.26**	**1.25**
Month 8	Opening balance	18.05	16.29	13.29	10.28	7.27	4.26	1.25
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.11	0.09	0.07	0.05	0.03	0.01
	Closing balance	**18.05**	**16.04**	**13.04**	**10.03**	**7.02**	**4.01**	**1.00**
Month 9	Opening balance	18.05	16.04	13.04	10.03	7.02	4.01	1.00
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25

	Interest	0.12	0.11	0.09	0.07	0.05	0.03	0.01
	Closing balance	**18.05**	**15.79**	**12.78**	**9.78**	**6.77**	**3.76**	**0.75**
Month 10	Opening balance	18.05	15.79	12.78	9.78	6.77	3.76	0.75
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.11	0.09	0.07	0.05	0.03	0.01
	Closing balance	**18.05**	**15.54**	**12.53**	**9.53**	**6.52**	**3.51**	**0.50**
Month 11	Opening balance	18.05	15.54	12.53	9.53	6.52	3.51	0.50
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.10	0.08	0.06	0.04	0.02	0.00
	Closing balance	**18.05**	**15.29**	**12.28**	**9.28**	**6.27**	**3.26**	**0.25**
Month 12	Opening balance	18.05	15.29	12.28	9.28	6.27	3.26	0.25
	Repayment	0.00	0.25	0.25	0.25	0.25	0.25	0.25
	Interest	0.12	0.10	0.08	0.06	0.04	0.02	0.00
	Closing balance	**18.05**	**15.04**	**12.03**	**9.02**	**6.02**	**3.01**	**0.00**
Principal Repayment		**0.00**	**3.01**	**3.01**	**3.01**	**3.01**	**3.01**	**3.01**
Interest		**1.44**	**1.33**	**1.09**	**0.85**	**0.61**	**0.37**	**0.13**

7.0 DEBT SERVICE COVERAGE RATIO (DSCR)

(Rs. in lacs)

Year	1	2	3	4	5	6	7
Profit After Tax (Net Profit)	2.07	4.40	6.87	7.06	7.24	7.43	7.62
Depreciation	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Interest	1.44	1.33	1.09	0.85	0.61	0.37	0.13
Total	**4.75**	**6.97**	**9.20**	**9.14**	**9.09**	**9.04**	**8.99**
Interest	1.44	1.33	1.09	0.85	0.61	0.37	0.13
Loan repayment	0.00	3.01	3.01	3.01	3.01	3.01	3.01
Total	**1.44**	**4.34**	**4.10**	**3.86**	**3.62**	**3.38**	**3.14**
DSCR	**3.29**	**1.61**	**2.24**	**2.37**	**2.51**	**2.68**	**2.86**

Average DSCR = 2.39

8.0 BREAK EVEN POINT (BEP)

(Rs. in lacs)

Year	1	2	3
A. Net sales	**36.00**	**42.00**	**48.00**
B. Variable cost			
Raw materials	20.53	23.95	27.38
Power & utility	1.51	1.76	2.01
Other expenses	0.11	0.13	0.14
Interest on Working Capital Loan	0.25	0.29	0.32
Total variable cost	**22.40**	**26.13**	**29.85**
C. Contribution (A-B)	**13.60**	**15.87**	**18.15**
D. Fixed & Semi-fixed Costs			
Salary	8.40	8.44	8.48
Repair & maintenance	0.45	0.46	0.47
Interest on Term Loan	1.44	1.33	1.09
Depreciation	1.24	1.24	1.24
Total fixed cost	**11.53**	**11.47**	**11.28**
E. BREAK EVEN POINT	**84.78%**	**72.26%**	**62.16%**
F. BEP at operating capacity	**50.87%**	**50.58%**	**49.73%**
G. Cash BEP	**45.41%**	**45.13%**	**44.28%**

9.0 INTERNAL RATE OF RETURN (IRR)

(Rs. in lacs)

Year	0	1	2	3	4	5	6	7
CASH OUTFLOW								
Capital Expenditure	16.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Working Capital	0.00	3.28	0.42	0.42	0.00	0.00	0.00	0.00
Total (A)	**16.38**	**3.28**	**0.42**	**0.42**	**0.00**	**0.00**	**0.00**	**0.00**
CASH INFLOW								
Profit After Tax		0.05	1.49	3.02	3.14	3.26	3.38	3.49
Add: Depreciation		0.73	0.73	0.73	0.73	0.73	0.73	0.73
Add: Interest		0.93	0.86	0.70	0.55	0.39	0.24	0.08
Add: Salvage Value								
Total (B)	**0.00**	**1.71**	**3.09**	**4.46**	**4.42**	**4.39**	**4.35**	**4.31**
NET FLOW (B-A)	**-16.38**	**-1.57**	**2.67**	**4.05**	**4.42**	**4.39**	**4.35**	**4.31**

IRR = 16%

Sl. No.	Name of the Machinery Suppliers	Communication Address
1.	M/s Shree Vishwakarma Yantrik Udyog	No. 132- 139, Karni Vihar, Road No. 17, Near Taj Marble, V. K. I. Area, Jaipur - 302013, Rajasthan
2.	M/s Santhosh Engineering Works	No. 20, Koniamman Nagar, Chinthamanipudur, Coimbatore.
3.	M/s Benny Industries	No. 12, Thadagam Road, Near Agarwal School, Somaiyampalayam Post, Coimbatore Pin- 641 108, Tamil Nadu