PROJECT REPORT

ON

SOIL CEMENT BLOCKS

PURPOSE OF THE DOCUMENT

This particular pre-feasibility is regarding 'Soil Cement Blocks'.

The objective of the pre-feasibility report is primarily to facilitate potential entrepreneurs in project identification for investment and in order to serve his objective; the document covers various aspects of the project concept development, start-up, marketing, finance and management.

[We can modify the project capacity and project cost as per your requirement. We can also prepare project report on any subject as per your requirement.]

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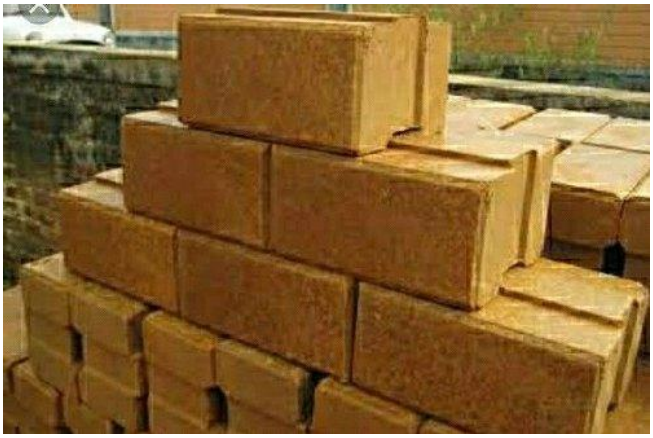
Nurturing Dreams - Innovative Solutions

PROJECT PROFILE
ON
SOIL CEMENT BLOCKS



INTRODUCTION OF THE PRODUCT

Soil cement blocks are cost effective and energy efficient alternative materials to the normal burnt clay bricks used for construction of buildings. Soil cement blocks are also known as stabilized mud blocks (SMB) or stabilized compressed earth block (SCEB).

Ordinary Portland cement is the most usual stabiliser added 5 to 10% by weight to the soil. Other stabilisers like lime, puzzolana or a combination of cement and lime are also used.

Soil cement blocks being usually 2 ½ times larger in size the normal burnt clay bricks, the construction is faster and the joints are consequently reduced. The less number of joints also result in cutting down the amount of mortar required. From the environmental considerations also, use of soil cement blocks in construction work result a substantial saving of energy as no fuel is required for its manufacture.

While in general building construction, soil cement blocks may be used as a substitute for normal burnt clay bricks, their use should be avoided in the case of isolated load bearing columns, piers and such heavily loaded structures.

MARKET & DEMAND ASPECTS

Housing is one of the three basic necessities of human life. Demand for housing is always far exceeds the supply. There is bound to be good scope for projects of this nature.
Traditionally, the burnt clay brick has been the common form of building construction material. There are other alternative construction materials like natural stone, cement concrete hollow blocks, etc.

Soil cement blocks are the ideal construction materials for low cost housing projects undertaken by the government under various housing schemes for upbringing of the common man. A number of government agencies are promoting the usage of this alternative building material in the construction activities.

Public awareness about the low cost housing using alternative building materials is more pronounced in urban areas rather than in rural areas where it is more required to be promoted. There is a need for suitable mechanism by which more and more rural housing schemes using low cost building materials are encouraged.

IMPLEMENTATION SCHEDULE

Sl	Description of the activity	Time (approx.)
1	Selection of the product	1 month
2	Preparation of the project report	
3	Selection of the location	
4	Registration of enterprise with DIC	
5	Mobilising finance for the project	4 months
4	Purchase of land	
5	Construction of building	
6	Procurement of machinery and equipment	
7	Obtaining EB connection	
8	Erection and commissioning of machinery and equipment	
9	Recruitment of manpower	1 month
10	Trial run and commencement of production	
	Total project implementation period	**6 months**

PRESUMPTIONS

(1) Interest rate: 11.50% per annum on total capital investment is taken into consideration
(2) Margin money: The promoter may bring in one-third of both fixed capital and working capital requirements.

(3) Efficiency: 60% utilisation of machinery and manpower has been considered.

(4) Labour wages: Minimum wages applicable for semi-skilled and unskilled workers were taken into consideration.

(5) Working shifts per day: It is envisaged that the enterprise will be in operation on single shift of 8 hours per day basis for 300 working days in year.

(6) Implementation period: Project implementation period of 6 months is envisaged

RAW MATERIALS

Soil or raw earth is the principal raw material. Ordinary Portland cement and water are other two constituents required for manufacture of soil cement blocks. Sand and crushed stone dust may also be added to the soil depending on the type of soil. Lime

and puzzolana cement are the alternative soil stabilizing materials may also be used. A combination of cement and lime is also used as a soil stabilizer.

MANUFACTURING PROCESS

The process of manufacture of soil cement blocks involves the following five steps:;

(1) Analysis of the soil
(2) Sifting of the soil
(3) Preparation of the mix
(4) Compaction of the blocks
(5) Curing of the blocks

(1) Analysis of the soil

Soil composition and analysis through comprehensive tests in a laboratory is very important. This will be required to estimate amount of cement, and other missing native constituents that must be added to the final mix. All soils are made up of three components: sand, silt, and clay. These components are defined on the basis of particle size, sand being the coarsest of the three and clay the finest.

Optimum composition of soil for soil cement blocks is made up of approximately 75% sand and only 25% of silt and clay. The clay content should never comprise less than 10% or more than 50% of the soil. Most soils , when reasonably free from vegetable matter, can be satisfactorily with cement, lime or cement and lime.

We can get a rough idea of the composition of the soil by simply picking up a handful and feeling it. Sand naturally has a coarse and gritty texture, while silt has the consistency of flour. Moist clay is smooth to the touch, is somewhat sticky, and will form a ribbon as you compress it between your thumb and forefinger.

We can estimate the percentages of each of the three components in the soil: (1) Fill a straight-sided glass jar about one-full of soil. (2) Add an equal amount of water. (3) Cover the jar and shake vigorously to suspend all the dirt. (4) Finally, allow the slurry to sit undisturbed about 30 minutes or until the soil has settled into three separate layers with the sand at the bottom.

(2) Sifting of soil

Soil should be dried and sieved (to remove large lumps, stones, leaves, and other impurities) before it can be used properly mixed with cement and compressed into blocks. Sturdy frames with metallic meshes can be used for sifting of soil.
The soil has the proper moisture content for sifting when (1) a handful can be squeezed without water appearing on its surface, and (2) the ball of soil disintegrates without lumps as it is released.

(3) Preparation of the mix

Once soil has been dried and sifted, we can begin to prepare the mix from which blocks will be pressed. The amount of Portland cement to be used will depend on the composition of the soil. Sandy soils require 5 to 9% cement by volume. Silty soils need 8 to 12%, and clay soils require 12 to 15% cement as stabiliser. More than 15% by volume is not recommended.

Mix thoroughly all the ingredients: cement, soil, and special additions such as sand or clay that may be needed. After drying mixing of all the ingredients, water is added a little at a time until the damp soil-cement reaches the right consistency. We can use a garden hose with te nozzle adjusted to produce a fine spray. A concrete mixer machine is suitable for preparing the mix.

Do the simple test to know the right consistency of the mix. Take a small amount of mix and form it into a ball in your hand, the resulting clod should both hold its shape and not stain your palm..

(4) Compaction of the blocks

Hydraulic operated machine is proposed in the project for compacting soil- cement into blocks of desired size. Hand-operated machines may also be used in place of power operated machines.

The prepared mix can placed into the mould of the machine and pressure is applied and after compaction, the block formed is ejected from the mould and stacked. Delicate touch is needed for removing the fresh blocks from the mould and stacking, as blocks are plastic and fragile when newly formed.

(5) Curing of the blocks

Place the blocks as soon as possible on a flat, non-absorbent surface in a shady environment to cure. Set each block on edges and space the blocks far enough apart so that they do not touch each other. After 24 hours of moulding blocks must be thoroughly sprinkled three times a day with the fine water spray. The slower the block dry, the stronger they will be. So, during the first four days of curing, blocks be covered

with plastic.

Blocks may be stacked after four days, but the sprinkling should be continued for another eight days. Finally, three weeks after leaving the mould, the blocks can be used in construction.

QUALITY SPECIFICATIONS

IS 1725 – 1982: Indian Standard Specification for Soil based Blocks used in General Building Construction (First Revision) (Reaffirmed 1997)

The above standard specifies requirements for soil cement blocks on the following parameters: sizes of blocks, compressive strength, water absorption, and weathering.

PRODUCTION CAPACITY

The plant and machinery proposed in the project has a production capacity of 900000 Nos. of soil cement blocks of size 29 x 9 x 9 cm. At 75% utilization of the capacity, productions of 720000 Nos. of blocks have been taken into consideration.

The above mentioned Indian Standard specification IS 1725 – 1982 specifies the following three sizes for soil cement blocks: 29 x 19 x 9 cm, 19 x 9 x 9 cm and 19 x 9 x 4 cm. Although soil cement blocks of all the three sizes could be made using the same machinery and equipment proposed in the project, for computation purpose only one size, viz 29 x 19 x 9 cm is considered in the sales turnover.

UTILITIES

Electrical Power requirement: 25 HP power for industrial purpose is required.

Water: water used should be free from acids, alkalis, oil, dissolved carbon dioxide and decayed vegetable matter. Generally, water suitable for human consumption is considered adequate for using with soil-cement mix.

RESOURCE CENTRE OF TECHNOLOGY

(1) Centre for Sustainable Technologies, Department of Civil Engineering, Indian Institute of Science, Bangalore – 560 012

(2) Development Alternatives, No.111/9-2, Kishangarh, Vasanth Kunj, New Delhi – 110 070 The above institutions may be contacted for comprehensive guidance on technology.

FINANCIAL ASPECTS

PROJECT AT A GLANCE

Product and By Product	:	**Soil cement block**	
Name of the project / business activity proposed :		**Soil cement block**	
Cost of Project	:	Rs.22.69 Lacs	
Means of Finance			
Term Loan		Rs.14.72 Lacs	
KVIC Margin Money		As per Project Eligibility	
Own Capital		Rs.2.27 Lacs	
Working Capital		Rs.5.71 Lacs	
Debt Service Coverage Ratio	:	3.67	
Pay Back Period	:	5	Years
Project Implementation Period	:	6	Months
Break Even Point	:	32%	
Employment	:	9	Persons
Power Requirement	:	25.00	HP
Major Raw materials	:	cement ,sand ,Soil or raw earth	
Estimated Annual Sales Turnover	:	38.88	Lacs

COST OF PROJECT (Rs. In Lacs)

Particulars	Amount
Land 2000 Sq mt	Rented/Owned
Covered area (50 Sqmt)	2.00
Brick platform(250 Sqmt)	1.50
Borewell with pump	0.75
Plant & Machinery	11.00
Furniture & Fixtures	0.75
Pre-operative Expenses	0.35
Working Capital Requirement	6.34
Total	**22.69**

MEANS OF FINANCE

Particulars	Amount
Own Contribution @10%	2.27
Term Loan	14.72
Workign Capital Finance	5.71
Total	**22.69**

Beneficiary's Margin Monery (% of Project Cost)

General 10%

Special 5%

PLANT & MACHINERY

1	Hydraulic block making machine with 15 HP motor	1	8,00,000.00	8,00,000.00
2	Concrete mixer: 10/7 cft with 5 HP motor	1	1,50,000.00	1,50,000.00
3	Water dosing pump	**1**	50,000.00	50,000.00
4	Electrical and EB charges for 25 HP power connection			1,00,000.00
				11,00,000.00

COMPUTATION OF MANUFACTURING OF SOIL CEMENT BLOCKS

Manufacturing Capacity per day	2,400.00	Pcs
No. of Working Hour	8	
No of Working Days per month	25	
No. of Working Day per annum	300	
Total Production per Annum	7,20,000.00	Pcs
Year	Capacity Utilisation	Pcs
IST YEAR	60%	4,32,000
IIND YEAR	70%	5,04,000
IIIRD YEAR	80%	5,76,000
IVTH YEAR	90%	6,48,000
VTH YEAR	100%	7,20,000

COMPUTATION OF RAW MATERIAL

Item Name		Quantity of Raw Material	Recovery	Unit Rate of / MT	Total Cost Per Annum (100%)
Cement	MT	360.00	100.00%	5,800.00	20,88,000.00
Sand or crushed stone sand	MT	2,400.00		300.00	1,80,000.00
Soil or raw earth	MT	4,800.00		150.00	1,80,000.00
					24,28,000.00
Annual Consumption cost			Total (Rounded off in lacs)		24.48

Raw Material Consumed	Capacity Utilisation		Amount (Rs.)
IST YEAR	60%		14.69
IIND YEAR	65%		15.91
IIIRD YEAR	70%		17.14
IVTH YEAR	75%		18.36
VTH YEAR	80%		19.58

COMPUTATION OF CLOSING STOCK & WORKING CAPITAL

PARTICULARS	IST YEAR	IIND YEAR	IIIRD YEAR	IVTH YEAR	VTH YEAR
Finished Goods					
(30Days requirement)	3.46	4.03	4.61	5.18	5.76
Raw Material					
(30 Days requirement)	1.47	1.59	1.71	1.84	1.96
Closing Stock	**4.92**	**5.62**	**6.32**	**7.02**	**7.72**

COMPUTATION OF WORKING CAPITAL REQUIREMENT

Particulars		Total
		Amount
Stock in Hand		4.92
Sundry Debtors		1.94
	Total	6.87
Sundry Creditors		0.49
Working Capital Requirement		**6.38**
Margin		0.64
Working Capital Finance		**5.75**

COMPUTATION OF SALE

Particulars	IST YEAR	IIND YEAR	IIIRD YEAR	IVTH YEAR	VTH YEAR
Op Stock	-	43,200	50,400	57,600	64,800
Production	4,32,000	5,04,000	5,76,000	6,48,000	7,20,000
	4,32,000	5,47,200	6,26,400	7,05,600	7,84,800
Less : Closing Stock	43,200	50,400	57,600	64,800	72,000
Net Sale	3,88,800	4,96,800	5,68,800	6,40,800	7,12,800
Sale Price per piece	10.00	10.00	10.00	10.00	10.00
Sale (in Lacs)	**38.88**	**49.68**	**56.88**	**64.08**	**71.28**

PROJECTED PROFITABILITY STATEMENT

PARTICULARS	IST YEAR	IIND YEAR	IIIRD YEAR	IVTH YEAR	VTH YEAR
A) SALES					
Gross Sale	38.88	49.68	56.88	64.08	71.28
Total (A)	**38.88**	**49.68**	**56.88**	**64.08**	**71.28**
B) COST OF SALES					
Raw Mateiral Consumed	14.69	15.91	17.14	18.36	19.58
Elecricity Expenses	2.15	2.33	2.51	2.69	2.86
Repair & Maintenance	-	0.50	0.57	0.64	0.71
Labour & Wages	7.92	8.71	9.58	10.54	11.60
Depreciation	1.89	1.65	1.42	1.22	1.04
Consumables and Other Expenses	1.94	2.48	2.84	3.20	3.56
Cost of Production	28.59	31.59	34.06	36.65	39.37
Add: Opening Stock /WIP	-	3.46	4.03	4.61	5.18
Less: Closing Stock /WIP	3.46	4.03	4.61	5.18	5.76
Cost of Sales (B)	25.13	31.01	33.48	36.07	38.79
C) GROSS PROFIT (A-B)	13.75	18.67	23.40	28.01	32.49
	35%	**38%**	**41%**	**44%**	**46%**
D) Bank Interest (Term Loan)	1.27	1.53	1.11	0.69	0.28
Bank Interest (C.C. Limit)	0.58	0.58	0.58	0.58	0.58
E) Salary to Staff	3.30	3.63	3.99	4.39	4.83
F) Selling & Adm Expenses Exp.	1.94	2.48	2.84	3.20	3.56
TOTAL (D+E)	**7.09**	**8.22**	**8.52**	**8.86**	**9.25**
H) NET PROFIT	6.66	10.45	14.88	19.15	23.24
I) Taxation	-	1.04	2.98	3.83	4.65
J) PROFIT (After Tax)	6.66	9.40	11.90	15.32	18.60

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