Profile No.: 50 **NIC Code: 23952**

HOLLOW AND CEMENT CONCRETE BRICKS

1. INTRODUCTION:

Cement concrete dense/ hollow bricks and blocks are very popular and are extensively used in building construction throughout the country because of the many advantages such as durability, strength and structural stability, fire resistance, insulation and sound absorption it Possess. The cement concrete blocks have an attractive appearance and are readily adaptable to any style of architecture. It lends itself to a wide variety of surface finishes for both exterior and interior walls. The blocks are used for both load bearing and non-load bearing walls. The hilly states of India have high humidity, dampness and rainfall, so the blocks are much useful for the N.E. Region, Himachal Pradesh, J&K, and U.P. etc. The blocks are made out of these blocks in masonry there is stone chips. With the use of these blocks in masonry there is saving in cement, stell, time and labour as compared with burnt bricks masonry. This saving, therefore, brings down the cost of construction considerably.

2. PRODUCT & ITS APPLICATION:

It is much needed in regions where traditional bricks are not easily available. It is also popular in case of requirement of low cost housing. The main advantage of concrete blocks is that their strength can be engineered to requirement. Thus making them relatively stronger than bricks by 15-20%. These blocks are 4-5 times bigger than burnt bricks; the size of the block or bricks used has a bearing on the strength of masonry. As the bigger size accounts for reduction in number of mortar joints, thereby increasing wall strength. Concrete blocks have an excellent thermal property, comparable to other masonry blocks. The cavities in the blocks provide better thermal protection and also do not need external or internal plastering. The performance of the blocks increases with increase in number of hollow cores, which may or may not be filled with some insulating material. The hollow blocks provide an

acceptable degree of sound insulation. Concrete blocks are inert, nontoxic and not prone to off gassing of volatile material. It has been observed that concrete blocks enable savings of approx. 8-9% per sq. mt. of masonry as compared with burnt brick. This is primarily because of the savings in mortar and faster construction speed, both due to larger block size and also due to the savings in plaster. Size optimization of concrete blocks also leads to increase in usable internal space, when compared to conventional fired brick construction. Construction technique involved is similar to other masonry units thus easily adaptable. Through decentralized local production it is easily available through a large number of manufacturers and distributors in most parts of the country in both rural and urban areas.

Applicability: Hollow concrete blocks are commonly used in Load bearing structure: - low rise residential and office buildings, bungalows, shelter units for rural housing, institutional buildings, godowns and warehouses etc.

In frame structures: - High rise residential apartment, office buildings, market complexes, Hospitals, Hotels etc.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Graduate in any graduate.

4. MARKET POTENTIAL AND MARKETING ISSUES, IF ANY:

The cement concrete dense/ hollow bricks and blocks are replacing conventional building bricks gradually due to the inherent properties like strength, size accuracy and insulation. These are used both for laying load bearing and non- load bearing walls. The cost of blocks is very much compared to the cost of red bricks and quite low, specially, in hilly regions where building bricks cannot be made whereas red bricks have to be procured from distant places thus incurring extra heavy transportation costs. Only in a few regions the good quality clay is available and red brick industry has come up there. But the cement building blocks can be made anywhere. The main raw material for production such as stone metals, sand grit etc. is abundantly available in any state. The blocks have some advantageous properties over the red building bricks. It is easy to construct wall that requires less mortar for inside

and outside plaster and joining. It provides good insulation against heat and cold and resists vibration and absorbs sound. So considering all the above mentioned factors, one can foresee to set up a unit.

5. RAW MATERIAL REQUIREMENTS:

All the raw materials required by the unit are available throughout the year. The raw material can also be procured from the nearby districts and from other states. The stock and procurement period proposed in this scheme is for a period of 10 days. The details of requirement for 100% capacity utilization in the unit are tabulated as below. The raw material required by the unit is proposed to be arranged through local distributors.

Concrete is a mixture of ordinary Portland cement, mineral aggregate (sand and stone chips) and water. The water used in preparing the concrete serves two purposes: (1) It combines with the cement to form a hardened paste (2) It lubricates the aggregates to form a plastic and workable mass The water that combines with the cement varies from about 22 to 28% of the total amount of mixing water in concrete. Mineral aggregates (sand and stone chips) are normally divided into two fractions based on their particle size. Aggregate particles passing through the No.4 or 4.7 mm Indian Standard sieve are known as fine aggregate. The particles retained on this sieve are designated as coarse aggregate. Natural sand is often used as fine aggregate in cement concrete mixture. Coarse aggregate are crushed stone chips. Crushed stone chips broken into particle sizes passing through the 4.7 mm sieve may also be used as fine aggregate. The maximum size of the coarse aggregate that may be used in cement concrete hollow blocks is 12.5 mm. However, the particle size of the coarse aggregate should not exceed one third thickness of the thinnest web of the hollow blocks. Ordinary Portland cement is the cementing material used in cement concrete hollow blocks. Cement is the highest priced material per unit weight of the concrete. Hence, the fine and coarse aggregates are combined in such proportions that the resulting concrete is workable and has minimum cement content for the desired quality.

6. MANUFACTURING PROCESS:

The process of manufacture of cement concrete hollow blocks involves the
Following 5 stages; (1) Proportioning (2) Mixing (3) Compacting (4) Curing (5) Drying
(1) Proportioning: The determination of suitable amounts of raw materials needed to produce concrete of desired quality under given conditions of mixing, placing and curing is known as proportioning. As per Indian Standard specifications, the combined aggregate content in the concrete mix used for making hollow blocks should not be more than 6 parts to 1 part by volume of Portland cement. If this ratio is taken in terms of weight basis this may average approximately at 1:7 (cement: aggregate). However, there have been instances of employing a lean mix of as high as 1:9 by manufacturers where hollow blocks are compacted by power operated vibrating machines. The water cement ratio of 0.62 by weight basis can be used for concrete hollow blocks.
(2) Mixing the objective of thorough mixing of aggregates, cement and water is to ensure that the cement -water paste completely covers the surface of the aggregates. All the raw materials including water are collected in a concrete mixer, which is rotated for about 1 ½ minutes. The prepared mix is discharged from the mixer and consumed within 30 minutes.
(3) Compacting the purpose of compacting is to fill all air pockets with concrete as a whole
Without movement of free water through the concrete. Excessive compaction would result in formation of water pockets or layers with higher water content and poor quality of the product.
Semi-automatic vibrating table type machines are widely used for making cement concrete hollow blocks. The machine consists of an automatic vibrating unit, a lever operated up and down metallic mould box and a stripper head contained in a frame work. 5 Wooden pallet is kept on the vibrating platform of the machine. The mould box is lowered on to the pallet. Concrete mix is poured into the mould and evenly leveled. The motorized vibrating causes the concrete to settle down the mould by approximately 1 ½ to 1 ¾ inches. More of concrete is then raked across the mould level. The stripper head is placed over the mould to bear on the levelled material. Vibration causes the concrete come down to its limit position. Then the mould box is lifted by the lever. The moulded hollow blocks resting on the pallet is removed and a new pallet is placed and the process repeated. The machine can

accommodate interchangeable mould for producing blocks of different sizes of hollow or solid blocks.

(4) Curing: Hollow blocks removed from the mould are protected until they are sufficiently Hardened to permit handling without damage. This may take about 24 hours in a shelter away from sun and winds. The hollow blocks thus hardened are cured in a curing yard to permit complete miniaturization for at least 21 days. When the hollow blocks are cured by immersing them in a water tank, water should be changed at least every four days. The greatest strength benefits occur during the first three days and valuable effects are secured up to 10 or 14 days. The longer the curing time permitted the better the product.

(5) Drying: Concrete shrinks slightly with loss of moisture. It is therefore essential that after curing is over, the blocks should be allowed to dry out gradually in shade so that the initial drying shrinkage of the blocks is completed before they are used in the construction work. Hollow blocks are stacked with their cavities horizontal to facilitate thorough passage of air. Generally a period of 7 to 15 days of drying will bring the blocks to the desired degree of dryness to complete their initial shrinkage. After this the blocks are ready for use in construction work.

7. MANPOWER REQUIREMENT:

The enterprise requires 15 employees as detailed below**:**

Sr. No.	**Designation of Employees**	**Salary Per Person**	**Monthly Salary ₹**	**Number of employees required**				
				Year-1	**Year-2**	**Year-3**	**Year-4**	**Year-5**
1	Machine Operators	12,000	24000.00	2	2	2	2	2
2	Helpers	8,000	48000.00	6	6	8	8	10
1	Production supervisor	15,000	15000.00	1	1	1	1	1
2	Accounts/Stores Asst	12,500	12500.00	1	1	1	1	1
3	Office Boy	9,000	9000.00	1	1	1	1	1
	Total		108500.00	11	11	13	13	15

8. IMPLEMENTATION SCHEDULE:

The project can be implemented in 3 months' time as detailed below:

Sr. No.	Activity	Time Required *(in months)*
1	Acquisition of premises	1.00
2	Construction (if applicable)	1.00
3	Procurement & installation of Plant & Machinery	1.00
4	Arrangement of Finance	2.00
5	Recruitment of required manpower	1.00
	Total time required *(some activities shall run concurrently)*	3.00

9. COST OF PROJECT:

The project shall cost ₹ 44.41 lacs as detailed below:

Sr. No.	Particulars	₹ in Lacs
1	Land	5.00
2	Building	5.00
3	Plant & Machinery	12.50
4	Furniture, Electrical Installations	0.50
5	Other Assets including Preliminary / Pre-operative expenses	1.25
6	Margin for Working Capital	20.16
	Total	**44.41**

10. MEANS OF FINANCE:

Bank term loans are assumed @ 75 % of fixed assets.

Sr. No.	Particulars	₹ in Lacs
1	Promoter's contribution	11.10
2	Bank Finance	33.31
	Total	**44.41**

11. WORKING CAPITAL CALCULATION:

The project requires working capital of ₹ 20.16 lacs as detailed below:

Sr. No.	Particulars	Gross Amt	Margin %	Margin Amt	Bank Finance
1	Inventories	10.08	0.25	2.52	7.56
2	Receivables	5.04	0.25	1.26	3.78
3	Overheads	5.04	100%	5.04	0.00
4	Creditors	-		0.00	0.00
	Total	20.16		8.82	11.34

12. LIST OF MACHINERY REQUIRED:

A detail of important machinery is given below: Power Requirement: 50 HP

Sr. No.	Particulars	UOM	Qtty	Rate (₹)	Value (₹ in Lacs)
	Plant & Machinery / equipments				
a)	***Main Machinery***				
i.	Hydraulically concrete block	NOS.	1	400000	4.00

	machine 15.5 HP				
ii.	Concrete mixer: 10/7 cft 5 HP	Nos	1	300000	3.00
iii.	weighing scale 500 Kgs	Nos	2	100000	2.00
b)					
i.	Water dosing pump	Nos	1	60,000	0.60
ii.	Electrical and EB charges	NOS.	1	21000	2.90
	sub-total Plant & Machinery				**12.50**
	Furniture / Electrical installations				
a)	Office furniture	LS	1	10000	0.10
b)	Stores Almirah	LS	1	5,000	0.05
c)	Computer & Printer	L. S.	1	10000	0.35
	sub total				**0.50**
	Other Assets				
a)	preliminary and preoperative				1.25
	sub-total Other Assets				1.25
	Total				**14.25**

13. PROFITABILITY CALCULATIONS:

Sr. No.	Particulars	UOM	Year-1	Year-2	Year-3	Year-4	Year-5
1	Capacity Utilization	%	60%	70%	80%	90%	100%
2	Sales	₹. In Lacs	60.48	70.56	80.64	90.72	100.80
3	Raw Materials & Other direct inputs	₹. In Lacs	52.28	61.00	69.71	78.43	87.14
4	Gross Margin	₹. In Lacs	8.20	9.56	10.93	12.29	13.66
5	Overheads except interest	₹. In Lacs	4.46	4.74	5.30	5.47	5.58
6	Interest	₹. In Lacs	3.33	3.33	2.22	1.67	1.33
7	Depreciation	₹. In Lacs	8.75	6.25	4.38	3.13	2.81
8	**Net Profit before tax**	₹. In Lacs	**-8.35**	**-4.76**	**-0.97**	**2.04**	**3.94**

14. BREAKEVEN ANALYSIS:

The project shall reach cash break-even at 50.60 % of projected capacity as detailed below:

Sr. No.	Particulars	UOM	Value
1	Sales at full capacity	₹. In Lacs	100.80
2	Variable costs	₹. In Lacs	87.14
3	Fixed costs incl. interest	₹. In Lacs	6.91
4	BEP = FC/(SR-VC) x 100 =	% of capacity	50.60%