PROJECT PROFILE ON CEMENT CONCRETE HOLLOW BLOCKS

PRODUCT	:	Cement Concrete Hollow Blocks
PRODUCTION CAPACITY	:	
Quantity	:	600000 Nos. per annum
Value	:	Rs 72 Lakhs per annum
QUALITY STANDARD	:	IS 2185 (Part 1): 2005 (Third Revision)
MONTH & YEAR of Preparation	:	January 2011
PREPARED BY	:	Glass & Ceramics Division MSME Development Institute Govt of India, Ministry of MSME 65/1, G.S.T. Road, Guindy, Chennai - 600 032 Phone: 044-22501011

INTRODUCTION OF THE PRODUCT

Cement concrete hollow blocks have an important place in modern building industry. They are cost effective and better alternative to burnt clay bricks by virtue of their good durability, fire resistance, partial resistance to sound, thermal insulation, small dead load and high speed of construction. Concrete hollow blocks being usually larger in size than the normal clay building bricks and less mortar is required, faster of construction is achieved.

Also building construction with cement concrete hollow blocks provides facility for concealing electrical conduit, water and sewer pipes wherever so desired and requires less plastering.

MARKET & DEMAND ASPECTS

Cement concrete hollow blocks are modern construction materials and as such are used in all the constructions viz. residential, commercial and industrial building constructions. Construction industry is a growing a sector. The demand for this product is always high in all cities and other urban centres due to construction of residential apartments, commercial buildings and industrial buildings.

Growing public awareness of the advantages of the product coupled with increase in the government and financial institutions support for housing which is a basic human necessity would ensure a healthy growth in the demand.

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: 15% 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: 75% 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

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.

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.

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 levelled. The motorised 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 moisturisation for atleast 21 days. When the hollow blocks are cured by immersing them in a water tank, water should be changed atleast 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.

QUALITY SPECIFICATIONS

IS 2185 (Part 1): 2005 Indian Standard: Concrete Masonry Units – Specification (Part 1) Hollow and Solid Concrete Blocks (Third Revision)

The above standard specifies requirements for these parameters: dimensions, grades of hollow blocks, blocks density, compressive strength, water absorption, drying shrinkage, and moisture movement

PRODUCTION CAPACITY

The plant and machinery proposed in the project has a production capacity of 800000 Nos. of cement concrete hollow blocks of size 100X200X400 mm. At 75% utilisation of the capacity, productions of 600000 Nos. of blocks have been taken into consideration.

Cement concrete hollow blocks are usually of the following three dimensions: 100X200X400 mm, 150X200X400 mm and 200X200X400 mm. Although hollow 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 100X200X400 mm is considered in the sales turnover.

Hollow blocks of other sizes could also be made depending on the user requirement. With the given set of machinery and equipment used in making the hollow blocks, solid blocks could also be made with the help of additional mould sets only.

UTILITIES

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

Water: water used in making concrete should be free from acids, alkalis, oil, dissolved carbon dioxide and decayed vegetable matter. Generally, water suitable for human consumption is considered adequate for concrete mixing.

FINANCIAL ASPECTS

FIXED CAPITAL

(1) LAND & BUILDING

Sl	Description	Quantity	Units	Rate per unit (Rs)	Amount (Rs)
1	Land	1000	Sq. meters	250	250000
2	Covered area	50	Sq. meters	5000	250000
3	Concrete platform	250	Sq. meters	1000	250000
4	Borewell with pump				75000
	TOTAL				**825000**

(2) MACHINERY & EQUIPMENT

Sl	Description	Quantity	Units	Rate per unit (Rs)	Amount (Rs)
1	Hydraulically operated concrete block making machine with quadruple (4) vibrators: hydraulic system – 5 HP Mould vibrators – 5 HP Ram vibrators – 3 HP (1.5 HP – 2 Nos.) Travel motor – 1 HP	1	No.	325000	325000
2	Concrete mixer: 10/7 cft with 5 HP motor, hydraulic hopper and road wheels	1	No.	200000	200000
3	Platform electronic weighing scale 500 kgs capacity	1	No.	75000	75000
4	Water dosing pump	1	No.	30000	30000
5	Electrical and EB charges for 25 HP power connection				70000
	Total				700000
6	Erection and commission-ing charges @ 10%				70000
7	Ram and mould for hollow blocks	4	Sets	25000	100000
8	Wheel borrows with pneumatic wheels	2	Nos.	10000	20000
9	Office equipment	LS			110000
10	Wooden palettes	LS			100000
	TOTAL				**1100000**

(3) PREOPERATIVE EXPENSES Rs 75000

(4) TOTAL FIXED CAPITAL Rs 2000000

WORKING CAPITAL (PER MONTH)

(1) SALARY & WAGES (PER MONTH)

Sl	Description	No.	Salary (Rs)	Amount (Rs)
1	Skilled or semi-skilled workers	2	5000	10000
2	Unskilled workers	8	4000	32000
3	Watch and ward	1	4000	4000
4	Manager/Supervisor	1	10000	10000
	Total			56000
	Perquisites @ 15%			8400
	TOTAL			**64400**

(2) RAW MATERIALS (PER MONTH)

Sl	Description	Quantity	Units	Rate per unit (Rs)	Amount (Rs)
1	Cement	50	Tons	4000	200000
2	Sand or crushed stone sand	200	Tons	250	50000
3	Crushed stone chips	300	Tons	400	120000
	TOTAL				**370000**

(3) UTILITIES (PER MONTH)

Sl	Description	Quantity	Units	Rate per unit (Rs)	Amount (Rs)
1	Power	1500	kWh	5	7500
2	Water	250	KL	20	5000
	TOTAL				**12500**

(4) MISCELLANEOUS EXPENSES (PER MONTH)

Sl	Description	Amount (Rs)
1	Office expenses	4000
2	Consumables	5000
3	Repairs and maintenance	5000
4	Sales expenses	6000
	TOTAL	**20000**

(5) TOTAL WORKING CAPITAL (PER MONTH) Rs 467000
(6) WORKING CAPITAL FOR THREE MONTHS Rs 1401000
(7) TOTAL CAPITAL INVESTMENT Rs 3401000

FINANCIAL ANALYSIS

(1) COST OF PRODUCTION (PER ANNUM)

Sl	Description	Amount (Rs)
1	Total recurring cost	5604000
2	Depreciation on building @ 5%	28750
3	Depreciation on machinery and equipment @ 10%	77000
4	Depreciation on moulds, wheel borrows, etc. @20%	66000
5	Amortisation of pre operative expenses @ 10%	7500
6	Interest on capital investment @ 15%	510150
	TOTAL	**6293400**

(2) SALES TURNOVER (PER YEAR)

Sl	Product item	Quantity	Rate	Value
1	Cement concrete hollow blocks of size 100X200X400 mm	600000 Nos.	Rs 12 each	Rs 7200000

(3) NET PROFIT (PER YEAR) Rs 906600

(4) PROFIT RATIO ON SALES 12.60%

$$\text{Profit Ratio On Sales} = \frac{\text{Net Profit Per Year}}{\text{Sales Turnover Per Year}} X\ 100 = \frac{906600}{7200000} X\ 100 = 12.60\%$$

(5) RATE OF RETURN 26.70%

$$\text{Rate of Return} = \frac{\text{Net Profit Per Year}}{\text{Total Capital Investment}} X\ 100 = \frac{906600}{3401000} X\ 100 = 26.70\%$$

BREAK EVEN ANALYSIS

(1) FIXED COST PER YEAR

Sl	Description	Amount (Rs)
1	Interest on capital investment	510150
2	Depreciations	179250
3	40% of salaries and wages	309120
4	40% of miscellaneous expenses	96000
	TOTAL	**1094520**

(2) BREAK EVEN POINT (B.E.P.) 54.70%

$$B.E.P. = \frac{Fixed\ Cost\ Per\ Year}{Fixed\ Cost\ Per\ Year + Net\ \Pr oift\ Per\ Year}\ X\ 100 = \frac{1094520}{2001120}\ X\ 100 = 54.70\%$$

LIST OF SUPPLIER ADDRESS FOR PLANT & MACHINERY

(1) Engineers Enterprises, No.189, Bharathiyar Road, Maniyakaranpalayam Road, Ganapathy, Coimbatore – 641 006

(2) BTEC Concrete Block Machines, No.466, Kamarajar Road, Lakshmipuram, Peelamedu, Coimbatore – 641 004

LIST OF SUPPLIER FOR RAW MATERIAL

Local stockists and dealers in the location of the project