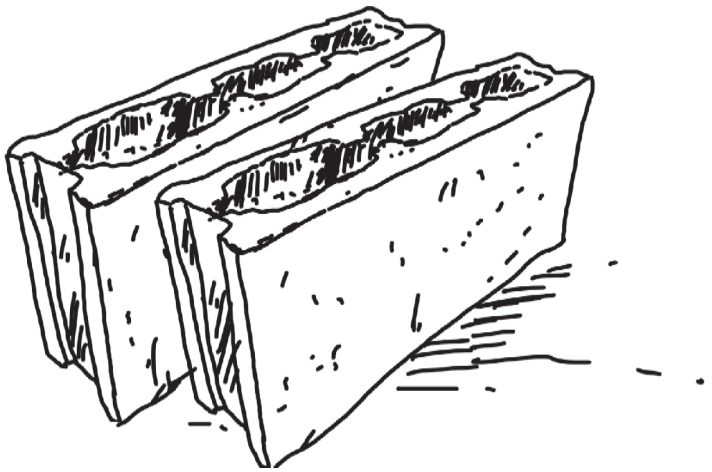
HOLLOW CONCRETE BLOCK



1.0 INTRODUCTION

Hollow and dense cement concrete blocks known as hollow blocks, have been developed as an alternative to bricks. The products are widely used in construction activity. The hollow blocks are made of cement, stone chips, stone dust and sand are not only cheaper than bricks but have other specialities as well. These blocks have more tensile strength, the walls constructed from these blocks act as thermal insulators because of their hollowness. 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, 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.

This project profile is for setting up of a Hollow concrete block with installed production capacity of 6.00 Lakhs concrete block/bricks of size per annum, based on 300 working days per annum and 8 working hours per day. Cement concrete hollow blocks are usually of the following three dimensions:

(a) 100X200X400 mm,
(b) 150X200X400 mm
(c) 200X200X400 mm.

2.0 MARKET POTENTIAL

As the construction activity is growing day by day, there is a good demand for hollow and cement concrete blocks/bricks. These blocks find wide applicability and construction cost is largely reduced. 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 reasonable and cheaper 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.

3.0 PROCESS DETAILS

The process of manufacture of cement concrete hollow blocks involves the following 5 stages;

(I) Proportioning
(II) Mixing
(III) Compacting
(IV) Curing
(V) Drying

(I) 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.

(II) 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.

(III) 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.

(IV) 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 at least 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.

(V) 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.

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	**6.60**
Plant & Machinery	**7.10**
Misc. Fixed assets	**2.20**
Preliminary & pre-operative expenses	**1.69**
Contingencies & escalation @ 3%	**0.48**
Working capital	**1.31**
TOTAL	**19.38**

4.1 Land & Site Development: Nil.

Total Land: 4 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, Storing Shed cum Office	2000	275	550000
		Sub total	**550000**
Add: Electrification, water supply and sanitation @ 20%			110000
		TOTAL	**660000**
		Say (Rs. in lacs)	**6.60**

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

Particulars	Qty	Rate (Rs)	Amount (Rs)
Concrete Block Making Machine with all accessories	1	275000	275000
Concrete Mixer	1	200000	200000
Block Moulds	4	25000	100000
Tipping Barrows	LS	–	20000
Miscellaneous items	LS	–	50000
		Sub total	**645000**
Add: Installation, transportation, etc @ 10%			64500
		TOTAL	**709500**
		Say (Rs. in lacs)	**7.10**

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

Particulars	Qty	Rate (Rs)	Amount (Rs)
Transformer and Fittings	1	175000	175000
Furniture	LS	–	15000
Miscellaneous items	LS	–	10000
		Sub total	**200000**
Add: Installation, transportation, etc @ 10%			20000
		TOTAL	**220000**
		Say (Rs. in lacs)	**2.20**

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	50000
Interest during implementation	59180
Miscellaneous expenses	50000
TOTAL	169180
Say (Rs. in lacs)	**1.69**

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	1.00	1.17	1.33
Power & Utility	30	0.05	0.06	0.07
Salary	30	0.53	0.54	0.54
Finished Goods	15	0.81	0.90	0.99
Receivables	15	0.89	1.04	1.18
Total		**3.28**	**3.70**	**4.12**
Working capital margin in Year 1 (40%)	**1.31**			

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%**	**7.75**
B. Subsidy from Central/State Govt.	**-**	
DEBT		
Term Loan from Banks/Financial Institutions	**60%**	**11.63**
TOTAL	**100%**	**19.38**

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)	600000	600000	600000	600000	600000	600000	600000
Capacity utilisation	60%	70%	80%	80%	80%	80%	80%
Production/annum at capacity utilisation	**360000**	**420000**	**480000**	**480000**	**480000**	**480000**	**480000**
Price of Bricks (Rs/Piece)	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Total income/annum	**21.60**	**25.20**	**28.80**	**28.80**	**28.80**	**28.80**	**28.80**
B. OPERATING EXPENSES							
Raw materials	12.18	14.21	16.24	16.24	16.24	16.24	16.24
Power & utility	0.61	0.71	0.82	0.82	0.82	0.82	0.82
Salary	6.48	6.51	6.54	6.58	6.61	6.64	6.68
Repair & Maintenance	0.24	0.25	0.25	0.26	0.26	0.27	0.27
Other Expenses	0.22	0.25	0.29	0.29	0.29	0.29	0.29
Total Operating Expenses	**19.73**	**21.93**	**24.14**	**24.18**	**24.22**	**24.25**	**24.29**
Operating profit	**1.87**	**3.27**	**4.66**	**4.62**	**4.58**	**4.55**	**4.51**
C. FINANCIAL EXPENSES							
Depreciation	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Interest on Term Loan	0.93	0.86	0.70	0.55	0.39	0.24	0.08
Interest on Working Capital Loan	0.16	0.18	0.20	0.20	0.20	0.20	0.20
Net Profit	**0.05**	**1.49**	**3.02**	**3.14**	**3.26**	**3.38**	**3.49**
Net cash accruals	**0.78**	**2.23**	**3.76**	**3.88**	**3.99**	**4.11**	**4.23**
Principal Repayment	0.00	1.94	1.94	1.94	1.94	1.94	1.94

6.1 Production capacity: Total production of **Concrete Blocks/Bricks** at 100% capacity utilization is estimated as below.

No. of Concrete Blocks/annum	600000 Nos.
Total production per annum at 100% capacity	**600000 Nos.**

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

Particulars	Qty	Price Per Unit (Rs.)	Amount (Rs.)
Cement	200 Ton	7000	1400000
Sand	300 C M	600	180000
Stone Chips	600 C M	750	450000
Expenses on raw material at 100% capacity (Rs)			2030000

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 20)	–	14.92	14.92
General Lighting	10	0.10	1.00
Total power requirement/ day (Kw)			15.92

No. of hrs/day	8
Nos. of days/annum	175
Annual power requirement (kwh)	22288
Rate per unit (Rs)	3.50
Expenses on power (Rs)	78008
B: Estimate of Utility	
Expenses on other Utility (Rs)	24000
Expenses on power & Utility at 100% capacity (Rs)	**102008**

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
Machine Operator	2	5000	120000
Skilled workers	4	4000	192000
Unskilled workers	6	3000	216000
Expenses on salary in the 1st year (Rs)			**648000**

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	6.60	1.00%	0.07
Plant & Machinery	7.1	2.00%	0.14
Misc. Fixed assets	2.20	1.50%	0.03
Expenses on repair & maintenance in year 1			**0.24**

6.6 Other Expenses: Other expenses have been assumed at 1% 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	6.60	3.34%	0.22
Plant & Machinery	7.10	5.28%	0.37
Misc. Fixed assets	2.20	6.33%	0.14
TOTAL			**0.73**

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	11.63	11.63	9.69	7.75	5.81	3.88	1.94
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest (8%)	0.08	0.08	0.06	0.05	0.04	0.03	0.01
	Closing balance	**11.63**	**11.47**	**9.53**	**7.59**	**5.65**	**3.71**	**1.78**
Month 2	Opening balance	11.63	11.47	9.53	7.59	5.65	3.71	1.78
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.08	0.06	0.05	0.04	0.02	0.01
	Closing balance	**11.63**	**11.31**	**9.37**	**7.43**	**5.49**	**3.55**	**1.62**
Month 3	Opening balance	11.63	11.31	9.37	7.43	5.49	3.55	1.62
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.08	0.06	0.05	0.04	0.02	0.01
	Closing balance	**11.63**	**11.14**	**9.21**	**7.27**	**5.33**	**3.39**	**1.45**
Month 4	Opening balance	11.63	11.14	9.21	7.27	5.33	3.39	1.45
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.06	0.05	0.04	0.02	0.01
	Closing balance	**11.63**	**10.98**	**9.04**	**7.11**	**5.17**	**3.23**	**1.29**
Month 5	Opening balance	11.63	10.98	9.04	7.11	5.17	3.23	1.29
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.06	0.05	0.03	0.02	0.01
	Closing balance	**11.63**	**10.82**	**8.88**	**6.95**	**5.01**	**3.07**	**1.13**
Month 6	Opening balance	11.63	10.82	8.88	6.95	5.01	3.07	1.13
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.06	0.05	0.03	0.02	0.01
	Closing balance	**11.63**	**10.66**	**8.72**	**6.78**	**4.85**	**2.91**	**0.97**
Month 7	Opening balance	11.63	10.66	8.72	6.78	4.85	2.91	0.97
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16

	Interest	0.08	0.07	0.06	0.05	0.03	0.02	0.01
	Closing balance	**11.63**	**10.50**	**8.56**	**6.62**	**4.68**	**2.75**	**0.81**
Month 8	Opening balance	11.63	10.50	8.56	6.62	4.68	2.75	0.81
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.06	0.04	0.03	0.02	0.01
	Closing balance	**11.63**	**10.34**	**8.40**	**6.46**	**4.52**	**2.58**	**0.65**
Month 9	Opening balance	11.63	10.34	8.40	6.46	4.52	2.58	0.65
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.06	0.04	0.03	0.02	0.00
	Closing balance	**11.63**	**10.18**	**8.24**	**6.30**	**4.36**	**2.42**	**0.48**
Month 10	Opening balance	11.63	10.18	8.24	6.30	4.36	2.42	0.48
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.05	0.04	0.03	0.02	0.00
	Closing balance	**11.63**	**10.01**	**8.08**	**6.14**	**4.20**	**2.26**	**0.32**
Month 11	Opening balance	11.63	10.01	8.08	6.14	4.20	2.26	0.32
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.05	0.04	0.03	0.02	0.00
	Closing balance	**11.63**	**9.85**	**7.91**	**5.98**	**4.04**	**2.10**	**0.16**
Month 12	Opening balance	11.63	9.85	7.91	5.98	4.04	2.10	0.16
	Repayment	0.00	0.16	0.16	0.16	0.16	0.16	0.16
	Interest	0.08	0.07	0.05	0.04	0.03	0.01	0.00
	Closing balance	**11.63**	**9.69**	**7.75**	**5.81**	**3.88**	**1.94**	**0.00**
Principal Repayment		**0.00**	**1.94**	**1.94**	**1.94**	**1.94**	**1.94**	**1.94**
Interest		**0.93**	**0.86**	**0.70**	**0.55**	**0.39**	**0.24**	**0.08**

7.0 DEBT SERVICE COVERAGE RATIO (DSCR)

(Rs. in lacs)

Year	1	2	3	4	5	6	7
Profit After Tax (Net Profit)	0.05	1.49	3.02	3.14	3.26	3.38	3.49
Depreciation	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Interest	0.93	0.86	0.70	0.55	0.39	0.24	0.08
Total	**1.71**	**3.09**	**4.46**	**4.42**	**4.39**	**4.35**	**4.31**
Interest	0.93	0.86	0.70	0.55	0.39	0.24	0.08
Loan repayment	0.00	1.94	1.94	1.94	1.94	1.94	1.94
Total	**0.93**	**2.80**	**2.64**	**2.49**	**2.33**	**2.18**	**2.02**
DSCR	**1.84**	**1.10**	**1.69**	**1.78**	**1.88**	**2.00**	**2.13**

Average DSCR = 1.84

8.0 BREAK EVEN POINT (BEP)

(Rs. in lacs)

Year	1	2	3
A. Net sales	**21.60**	**25.20**	**28.80**
B. Variable cost			
Raw materials	12.18	14.21	16.24
Power & fuel	0.61	0.71	0.82
Other expenses	0.22	0.25	0.29
Interest on Working Capital Loan	0.16	0.18	0.20
Total variable cost	**13.17**	**15.35**	**17.54**
C. Contribution (A-B)	**8.43**	**9.85**	**11.26**
D. Fixed & Semi-fixed Costs			
Salary	6.48	6.51	6.54
Repair & maintenance	0.24	0.25	0.25
Interest on Term Loan	0.93	0.86	0.70
Depreciation	0.73	0.73	0.73
Total fixed cost	**8.39**	**8.35**	**8.23**
E. BREAK EVEN POINT	**99.43%**	**84.82%**	**73.14%**
F. BEP at operating capacity	**59.66%**	**59.38%**	**58.51%**
G. Cash BEP	**54.43%**	**54.15%**	**53.29%**

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