

## USE OF LIGHTWEIGHT CONCRETE

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**ABSTRACT:** *Bricks are the Predominant construction material in the country. The CO<sub>2</sub> emission in the brick manufacturing process creates global warming. Now a day we focused to use such type of materials which are environment friendly. So we use cellular lightweight concrete block in building construction industry because it is environment friendly. Also, CLC Block reduced mortar consumption, offering a unique combination of high durability, strength and faster speed of work as compared to red bricks.*

**KEYWORDS:** *CLC Block, Cellular Light Weight Concrete Block, Light Weight Block, Fly Ash Blocks, Concrete Blocks*

### I.INTRODUCTION

Bricks are one of the most important building materials. As the requirement of bricks increases the brick kilns have to grow to fulfill the demand. During the preparation process of the red bricks the kiln makes air pollution and it is the cause of global warming and climate change. Also, we use the fertile soil to make the red bricks which is essential for farming. Furthermore, a large amount of energy is required for red brick manufacturing process. So, to reduce the environment pollution, carbon emission, and energy consumption the red bricks have to be replacing on alternative. Cellular light weight concrete blocks are appropriate alternatives of red bricks.

CLC bricks are environment friendly due to no emission of toxic gases and less energy consumption. Also, the use of CLC bricks is good because of its low compressive strength and high insulation against heat and sound. The red bricks are much heavier than CLC blocks which increases the dead load of the structure and the risk associated with the concrete structure.

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**Figure 1: Air pollution from red brick kiln by Express News Service, New Delhi**

## **II.MATERIALS AND EQUIPMENTS**

### **A. Cement:**

Use ordinary Portland cement of grade 43 or 53 confirming in IS 12269:1987.

### **B. Fly Ash:**

It is the bye product of coal, generated from the thermal power plant. Fly ash is confirming in IS 3812(PART-1).

### **C. Foaming agent:**

Ensure that foaming agents bubble stable for duration beyond the final setting time. The addition of foam creates tiny voids or cells in the mix resulting in cellular structure and lighter weight.

### **Equipments required for making CLC blocks:**

- A. Mixer
- B. Control Panel
- C. Load Indicator
- D. Foam Generator
- E. Air Compressor
- F. Belt Conveyor
- G. Trolley
- H. Moulds

## **III.BLOCK DIMENSION**

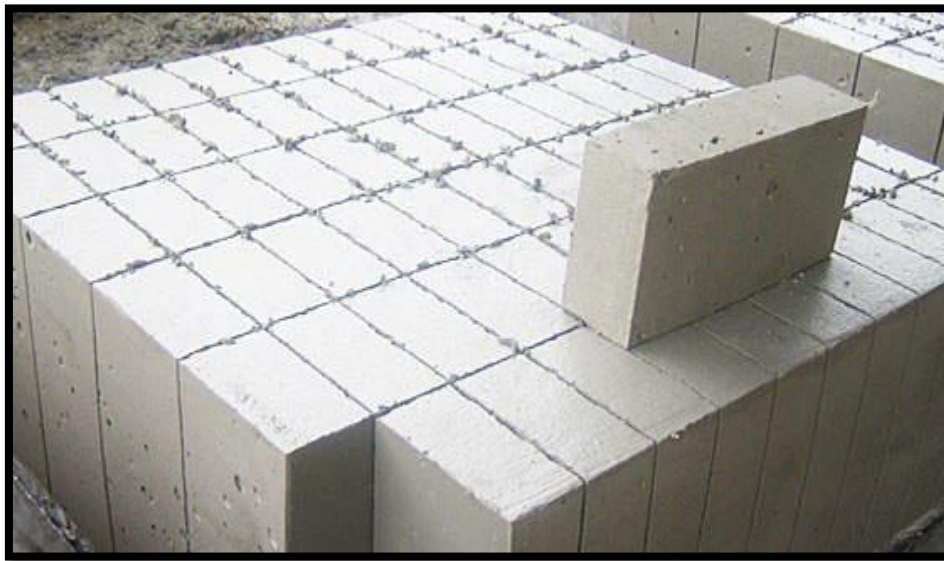
It is confirming in IS 2185(Part-4):2008 that the nominal dimension of concrete block is

Length: 400,500 or 600mm

Height: 250 or 300mm

Width: 100,150,200 or 250mm

Also, it is confirming in IS 2185(Part-4):2008 that we take any size of blocks agreed between Purchaser and manufacturer.



**Figure2: CLC Blocks image by Aircon CLC block Rajiv Nagar**

#### **IV.ADVANTAGES**

**Light in Weight:** The density of CLC blocks vary from 600 to 800 Kg/cum. This is almost three times less than the traditional clay bricks or red bricks.

**Eco friendly:** CLC blocks are made of material such as fly ash and other industrial wastes. The production process of CLC blocks doesn't release any harmful effluents that affect soil, water or air.

**Sound and Thermal Insulation:** CLC Blocks are excellent for both Sound insulation and Heat Insulation. This decreases the energy spent on heating and cooling the houses thereby decreasing the electricity costs for the house owners.

**Reduced Construction Cost:** The overall dead load of structure is decreased when CLC blocks are used in construction. By optimizing the design accordingly house owners can save money on major construction materials like cement and reinforcement.

**Lower Water Absorption:** Due to the presence of air pockets which are not interconnected, the water absorption of CLC blocks is relatively lower than any other materials. The low water absorption property of these blocks will help to reduce the cracks in the walls.

**Easy to Handling:** Due to its light weight CLC blocks are easy to handle and install, thus minimizing the construction costs.

#### V.COMPARISON WITH RED BRICKS

S.NO	PARAMETERS	CLC BLOCKS	RED BRICKS
1	Raw Materials	Cement, Fly Ash, Water and Foam	Top agricultural soil
2	Compressive Strength	2-6 N/mm <sup>2</sup>	3.5-8 N/mm <sup>2</sup>
3	Dry Density	650kg/m <sup>3</sup> -900kg/m <sup>3</sup>	1900-2300kg/m <sup>3</sup>
4	Water Absorption	12-15% by volume of block	18-24% by volume of brick
5	Environment Friendly	It is pollution free	Prepare by using agricultural land and create smoke
6	Affect on structure	Reduce Dead load	Increase Dead load
7	Sound insulation	Better than red brick	Normal
8	Thermal Insulator	Great Thermal insulator	Low insulator as CLC
9	Quality of Product	Depend on quality of Foam and proportion of materials	Depend on manufacturing process and raw materials
10	Availability	Currently not much plant at local level	Easily available in local market
11	Brick masonry	Less mortar required as compare to red brick	Required much

#### VI.CONCLUSIONS

To the production of the red brick the industries produce air pollution and also it requires high energy to burn due to the emission of CO<sub>2</sub> gas. The compressive strength of foamed concrete and the water absorption is found to be within the prescribed limit as mentioned in IS Code. The density of the CLC blocks is less than the red bricks through which it reduces the dead load of the structure and it also decrease the amount of reinforcement due to less dead load. Speedy construction due to its light weight and big size. Also, it is easy to cut in any size or shape.

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