

## Eco Friendly Material- Rammed Earthen Brick

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**Abstract:** Affordable housing is a term used to describe dwelling units whose total housing costs are demand "Affordable" to a group of people within a specified income range. In building the foundation, walls, doors, windows, floors and roofs are the most important components, which can be analyzed individually, based on the needs thus, improving the speed of construction cost, based on the criteria of design. We have attempted to design a low cost housing building using an innovative construction technique called **RAMMED EARTHEN BRICK. Rammed Earthen Brick.** is a new materials for structural systems; the idea for improvement of stability of soil by using wooden husk and the artificial material like polyfiber are used. In this paper we will attempt to study compressive strength of IInd class burnt clay brick and rammed earthen brick.

**Keywords:-** Rammed earthen brick, Poly fiber, wooden husk, compressive strength, eco friendly

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### I. Introduction

We aim to do this through promoting improved and appropriate house building techniques- using cheap, locally available materials and it saves money and are less vulnerable to environmental hazards. The house included some new techniques, which helps to develop rural and urban area.

Proper housing is one the of basic needs for the millions of people living below poverty line across the world today. This affordable housing and the climate should be compatible with one another so that inhabitants of a house in a hot climate should have cool living conditions whilst the inhabitants of houses in cold areas need warmth. Mechanically pressed soil products such as blocks in and tiles can compete favorable with conventional fired clay bricks and concrete blocks in both quality and durability. Reinforced cement concrete structures are very popular and widely used all over the world today, but its economic value is higher than any other building materials. Thus, there exists a need for more economical and readily available substitute like rammed earthen brick or rammed earthen wall.

Scientists and engineers are constantly seeking for new materials for structural systems; the idea of using bamboo as possible reinforcement has gained popularity with due course of time. Since time immemorial, bamboo has been used traditionally as a building material in the world's tropical and sub-tropical regions. Bamboo is renewable and versatile resource, characterized by high strength and can be easily worked on using simple tools. As such, bamboo construction is easy to build, resilient to wind and even earthquake forces and readily repairable in the event of damage. Bamboo is locally available and it can substantially mitigate the housing problem in rural areas in constructing an efficient, low cost and light weight structures. And for improvement of stability of soil, wooden husk and the artificial material is used like polyfiber are used. In this paper we will attempt to study compressive strength of IInd class burnt clay brick and rammed earthen brick.

### Rammed Earth

Rammed earth is an ancient construction technique which has recently gained renewed interest, due to varied sustainable benefits. In this technique, the moisten soil is stabilized by adding wooden and polyfibers. It is filled in a temporary formwork (wooden or steel) and compacted/rammed into successive layers of ~10 to 12 cm thick by means of rammer. After compaction of every couple of layers (equivalent to height of formwork), the formwork is raised (if necessary) at higher level and the process is continued until the desired construction is completed. The soil suitable for rammed earth construction will generally have less clay and sand content and the moisture content of the rammed earth mix just prior to compaction shall be within the optimum moisture content for maximum dry density compaction.

### Eco friendly construction Material

While manufacturing process of conventional burnt clay brick, there is a large amount of CO<sub>2</sub> released and unwanted odour releases in environment which is harmful to human life.

But in manufacturing process of Rammed earthen brick burning process is not required so CO<sub>2</sub> and unwanted odour is not generated. so Rammed earthen brick is an eco friendly construction material.

It acts as thermal insulation in buiding. It keeps warm in room during mansoon season and it keeps cool in room during summer season.

## II. Methodology

### 1. Selection Of Soil:-

The soil used is collected from surrounding area having the less clay and sand content and the moisture content of the rammed earth mix just prior to compaction shall be within the optimum moisture content for maximum dry density compaction.

### 2. MIXING:-

Prepare the soil mixture by adding following ingredients in soil.

Soil sample: 70% of total volume

Wood husk: 30% of total volume

Water: 50% of soil sample

Poly Fiber: 100gm per 100kg of soil.

### Poly Fiber Effect And Wooden Husk

Soil has property of bulking when it is in contact with water. Due to this property the cracks are forms in the wall To reduce the cracks, poly fiber is used. Due to poly fiber the bonding between the molecules will be strong. And wooden husk also be helps to minimize the cracks and make the material light weight.

### 4. PLACING:-

The prepared mix of soil by adding wooden husk and fibers are placed in the framework by means of three layers with applying suitable compaction on each layer of soil. The framework may be steel or wooden both are suitable for soil. The framework should be strong to carry the load of soil placed and leakage proof.

### 5 DRYING:-

After completion of placing the formwork it is kept for drying for the period of three days. When Soil become hard, formwork can be remove. When the soil begins to get dry, it gains the strength.

### Observation Table

| Sr.no. | Name of Item       | No. of Sample tested | Size (mm)   | wt.(kg) | Compressive Strength (N/mm <sup>2</sup> ) |
|--------|--------------------|----------------------|-------------|---------|-------------------------------------------|
| 1      | Conventional Brick | 24                   | 220x100x100 | 2.854   | 4                                         |
| 2      | Rammed Earth       | 24                   | 220x100x100 | 2.583   | 12                                        |

## III. Conclusion

- The strength of Rammed earthen brick is more than Burnt clay brick .
- The self weight of the Rammed earthen brick is less than Burnt clay brick .
- The cost of manufacturing is low as compared to the Burnt clay brick
- The manufacturing process of Rammed earthen brick is simple as compared to Burnt clay brick .
- In the Rammed earthen brick, burning process is not required but it is compulsory in manufacturing process of Burnt clay brick.

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## References

- [1]. IS :1077 (1992)-Common burnt brick specification.
- [2]. IS :456 (2001) – For testing of bricks.
- [3]. Building materials By SK Duggal
- [4]. Building materials and construction by SS bhavikatti.
- [5]. Building construction By Rangawala
- [6]. Building construction By BC punmia