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Comparative Study of Different Types of Bricks

Viraj. V Jadhav, Viraj. V Raut, Viraj. T Gavade, Tejas. S Patil, Mrs. Vandana R. Shah
Sanjay Ghodawat Institute, Kolhapur-Sangili Highway, Atigre

Abstract: *Construction industry is bring up new materials to reduce environmental effect and to improve performance. Traditional burnt clay bricks Generate environmental pollution due to soil digging and fuel usage. Therefore, Different types of bricks such as Fly Ash Bricks, AAC Blocks, Papercrete Bricks and Cow Dung Bricks are Developed.*

In this research work, a comparative study on four different types of bricks was done. The tests taken place were Compressive Strength Test, Water Absorption Test, Hardness Test and Shape & Size Test as per IS standards.

From the experimental results, Fly Ash bricks showed high level compressive strength, AAC blocks showed lightweight properties with medium level strength, while eco-friendly bricks like Papercrete and Cow Dung bricks have lower strength but better for environmental protection. The study shows that brick selection depends on structural requirement, economy and environmental factors.

Keywords: Fly Ash Brick, AAC Block, Papercrete Brick, Cow Dung Brick, Compressive Strength, Water Absorption

I. INTRODUCTION

Bricks are one of the most Necessary construction materials used in residential and commercial buildings. Traditionally, burnt clay bricks were Commonly used in India. However, large level of production of clay bricks causes to decrease of Agricultural soil, Air pollution and environmental pollution.

To solve this problems, other option and eco-friendly bricks are being created by using industrial waste and agricultural waste materials. In this study, four types of bricks were picked for comparative study:

o Fly Ash Bricks
o AAC Block Bricks
o Papercrete Bricks
o Cow Dung Bricks

The main goal of this research is to compare physical properties of these bricks by taking different testing and selected for suitability in construction.

II. OBJECTIVES OF STUDY

The objectives of this study work are:

- To study different types of eco-friendly bricks.
- To undertake compressive strength test on selected bricks.
- To determine water absorption strength.
- To check the hardness of bricks.
- To study shape and size of brick.
- To compare overall performance of different bricks.

III. MATERIALS DESCRIPTION

3.1 Fly Ash Bricks

Fly ash bricks are made by using fly ash, cement, sand and water. Fly ash is a waste item from thermal power plants. These bricks are eco-friendly and have high compressive strength.

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3.2 AAC Blocks

AAC (Autoclaved Aerated Concrete) blocks are lightweight blocks and made from cement, lime, fly ash and aluminum powder. These blocks have good thermal insulation and reduced deadload.

3.3 Papercrete Bricks

Papercrete bricks are made from wastepaper pulp mixed with cement and sand. These bricks are lightweight and eco-friendly but have lower strength.

3.4 Cow Dung Bricks

Cow dung bricks are prepared by mixing cow dung with soil and natural binder materials. These bricks are biodegradable and environmentally friendly.

IV. EXPERIMENTAL METHODOLOGY

Four tests we have were conducted on all types of bricks:

1. Compressive Strength Test
2. Water Absorption Test
3. Hardness Test
4. Shape and Size Test

All tests were taken place as per IS 3495 standard codes.

V. EXPERIMENTAL TESTS

5.1 Compressive Strength Test

The brick sample was placed on Compression Testing Machine (CTM). Load was applied step by step until failure occurred.

Compressive Strength = Load at Failure / Loaded Area

5.2 Water Absorption Test

Bricks was oven dried at 105°C for 24 hours and weighed (W1). Then they were placed in water for 24 hours and weighed again (W2).

Water Absorption (%) = (W2 – W1) / W1 × 100

5.3 Hardness Test

Scratch test was conducted using a sharp steel tool.

Fly Ash show no visible scratch (Good hardness).

AAC showed slight scratch (Medium level).

Papercrete and Cow dung bricks show clear scratch marks.

5.4 Shape and Size Test

o Bricks were measured using scale and checked for uniformity.

o Fly Ash show uniform size and sharpSides.

o AAC blocks were accurate in size.

o Papercrete and Cow dung bricks are uniform shape and size.

VI. RESULTS AND DISCUSSION

From test study, show that:

Fly Ash bricks have high compressive strength and low water absorption.

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AAC blocks reduce dead load but have medium level strength.
Papercrete and Cow dung bricks are proper use only for non-load bearing building because of low level strength and high-water absorption.
Fly Ash bricks are most proper for all structures, while eco-friendly bricks can be used for low-cost housing.

VII. CONCLUSION

A. Based on taken test study, the following conclusions are show:
B. Fly Ash bricks showed best overall performance.
C. AAC blocks are lightweight and suitable for walls.
D. Papercrete and Cow dung bricks are environmentally friendly but suitable only for non-structural uses.
E. Therefore, choice of brick depends upon structural requirement, cost and sustainability.

VIII. FUTURE SCOPE

i. To develop an eco-friendly and sustainable bricks.
ii. Improve the strength, water absorption and durable.
iii. To reduce the pollution and use as recycle.
iv. Improvement in strength of bio bricks.

IX. TABLE

Brick Type	Compressive Strength (N/mm²)	Water Absorption (%)	Hardness	Shape & Size
Fly Ash Brick	9.2	13.10%	Good	Uniform
AAC Block	4.3	12.7%	Moderate	Accurate
Papercrete	3.0	36%	Low	Slightly Irregular
Cow Dung	2.3	40%	Low	Irregular

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