

Production of Eco Brick From Industrial Waste Through Alkali Activation Technology

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Abstract- Due to the high cost of building, the majority of people in India struggle to own a home. In several nations around the world, the need for locally produced building materials has been emphasized. There is an imbalance between the high cost of conventional building materials and their diminishing supply. For the 60–70% of families who fall into the low-income category, housing becomes a serious issue. Low-cost alternative building materials have received a lot of attention as a solution to this issue. This lowers housing costs and makes housing more accessible for India's expanding population. The construction industry is the most significant source of building materials, and clay bricks are widely used. About 20 billion bricks and 27% of the nation's total natural energy are used in the construction industry in India. Additionally, the inferior quality and higher water absorption ratio of the clay bricks that are available in a particular region have compelled engineers to search for superior materials that might lower the cost of construction.

The world over, bricks, which are masonry units made of inorganic, non-metallic materials, are frequently employed as building materials. The bricks could be burned or sun-dried. In general, burned bricks are more durable than sun-dried bricks. Particularly if they are made of clay or another clay-like material. Depending on the admixtures and raw materials used in brick production, there are several varieties of bricks. It is also standard practise to add certain admixtures to raw mixtures in order to get specific results in the final product. The excessive use of clay harms society since it is used to make typical clay bricks, which are made from superior clay mined from agricultural regions.

Keywords- Alkali Activation Technology, Industrial Solid Wastes, Sodium Hydroxide, Lime Etc.

I. INTRODUCTION

A basic need is housing. Due to the high cost of building, the majority of people in India struggle to own a home. In several nations around the world, the need for locally produced building materials has been emphasized. There is an imbalance between the high cost of conventional building materials and their diminishing supply. For the 60–70% of

families who fall into the low income category, housing becomes a serious issue. Low-cost alternative building materials have received a lot of attention as a solution to this issue. As a result, housing costs are reduced, making housing more accessible for India's expanding population. The construction industry is the most significant source of building materials, and clay bricks are widely used. About 20 billion bricks and 27% of the nation's total natural energy are used in the construction industry in India. Additionally, because the clay bricks in a particular region are of very poor quality and have low compressive strength, high water absorption rates, etc., engineers have been obliged to search for superior materials that can lower construction costs.

Bricks are masonry units that are widely used as building materials all over the world. They are made of inorganic, non-metallic material. Burnt bricks or sun-dried bricks are both acceptable. Burnt bricks are more durable than sun-dried bricks, particularly if they are constructed of clay or other clay-like substance. Depending on the additives and raw materials used to make bricks, there are several varieties of bricks. To achieve different effects in the finished product, specific admixtures are added to the raw combinations of burnt brick. Given that all traditional clay bricks require high-quality clay, which is only available from agricultural fields, a limitless usage of clay is obviously destructive to society.

II. METHODOLOGY

We first identified the issues before consulting and reviewing the research papers for the study on bricks. The materials needed to complete the project, such as industrial trash and dirt, were then gathered. After doing various laboratory tests on the soils, making bricks by adjusting the amounts of clay, solid waste wood powder, solid waste metal powder, and solid waste marble powder, and then testing the bricks themselves.

Analysis of the brick test findings was done after the tests had been conducted. Following result analysis, it was determined how much it would cost to manufacture one brick and it was determined that "NaOH bricks" had superior

compressive strength to "water mixed bricks" in general. Further lessened the impact of some industrial waste.

III. LITERATURE REVIEW

In this connection the following literature has been reviewed.

An Approach for Alternative Solution in Brick Manufacturing

Because industrial waste is inherently toxic, its disposal is a big challenge.

A reasonable answer to the pollution problems is recycling such trash and using them as building materials. In this study, an attempt is made to implement such a different strategy employing recycling, fly ash, granite dust, cost feasibility, and energy savings.

By increasing the proportion of fly ash and granite dust, the maximum compressive strength was attained. These bricks have a relatively lower water absorption capacity than clay bricks. Bricks made of fly ash and granite dust demonstrate energy efficiency, are less expensive, and strive to be "greener, eco-friendly bricks for construction."

Fabrication of Plastic Brick Manufacturing Machine and Brick Analysis-

Plastic is a substance that is both useful and hazardous in equal measure. Although plastic is incredibly useful, it is often just thrown away after use, creating risks. Since plastic cannot biodegrade, it will remain hazardous for many decades to come.

Sand and plastic were combined to make a new brick in the process. Since obtaining the machine from a nearby brick company would be unprofitable, they created it themselves in the nearby engineering factory.

Both a compressive test and a water absorption test were conducted on the brick. Positive findings showed that the Plastic Fused Brick performed better than both cement and clay bricks.

With an increase in the percentage of waste plastic, the compressive strength decreases. The various 5%, 10%, and 15% ratios.

IV. CONCLUSIONS

- Compared to normal brick, eco bricks have a load carrying capability that is 90% higher.
- Eco bricks are more durable than regular bricks. Eco bricks are heavier and more compact, which increases their resistance to downward force.
- Eco bricks weigh more than regular bricks.
- Standard bricks come in pink, white, yellow, or red hues. Due to the high iron content, the colour is pink; as the temperature rises, the colour changes to various shades of red. Eco bricks' colour changes depending on the materials used. The colour can be brown, red, or grey.
- Eco bricks reduce pollutants, but pollution from ordinary bricks increases. Eco bricks are economical than conventional bricks. Due to the use of industrial solid waste in eco bricks it reduces manufacturing cost than conventional bricks.
- Waste is a significant environmental issue and a threat to the ecosystem. Waste management in developing nations has been and continues to be a difficulty; this could have a severe impact on human and animal health as well as the land and aquatic eco systems.
- By utilizing industrial trash, this initiative helps to reduce the loss of prime fertile land that can be used for construction.
- Burnt and unburned bricks were used in the tests, together with and without the addition of NaOH.
- Alkali activation method fully eliminated the negative effects of carbon dioxide emissions on the environment. In this project differ.
- For bricks burned using alkali activation technology, the efficient water absorption rate was 15.8%, with the proportions being 20:60:10:10 [clay: Metal Powder: Marble Powder: Wood Powder].
- When a brick is dropped from a height of one meter, it also develops its hardness quality.
- The brick's soundness property is also attained.

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