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Compressive Strength of Bagasse Ash Replacement Cement in Brick

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Abstract

The required for reasonable and sustainable unusual construction resources to cement in rising countries cannot be underemphasized. Compressed Earth Bricks have gain acceptability as an inexpensive and sustainable construction substance. There is through a required to increase its bearing capacity. Preceding investigate show that Sugarcane Bagasse Ash as a soil stabilizer has yielded optimistic results. However, there is limited investigate on its effect on the mechanical possessions of Compressed Earth Brick.

This current research investigated the effect of adding 4%, 6%, 9% and 11% Sugarcane Bagasse Ash on the compressive strength of compressed earth brick. The consequence showed improvement in its compressive strength by 66% with the addition of 11% Sugarcane Bagasse Ash.

Keywords:*Bagasse ash, Pozzolanic material, Normal consistency, Setting time, Compressive strength, Water penetration depth.*

INTRODUCTION

General

Brick-

Brick is one of the oldest materials extremely used in building construction. Standard size/modular size 19*9*9cm.Nominal size of brick = 20*10*10cm.A indent mark is placed on the top face of brick of size 10*4*1-2cm.

Uses of frog-

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- Frog provides a key to held mortar.
- It is also used to keep manufacturer's name.
- Traditional brick 9*4.5*3 inch.



Figure 1 Brick

Classification of bricks-

1- First class brick
2- Second class brick
3- Third class brick
4- Fourth class brick / Jhama brick

First class brick-

These bricks are table moulded and burn in kiln. These are thoroughly burn and of red cherry, copper colour. Surface should be rectangular, parallel, sharp, straight corners. It should free from flaws, pebble etc. If two bricks are struck together, metallic or ringing sound should come. No indent mark should be shown when sketch is made by nail. Brick should be free from lumps. The water absorption should not be more than 20% of its dry weight when immerged in fresh water for 24 hours. Minimum compressive strength is equal to 10.5 N/mm2.

* Used for exposed brick work, flooring of reinforced brick work and all other important works.

Second class brick-

Second class brick are same of first brick expect discovered below. These are ground moulded and burn in kiln. Small distortion may be allowed. Absorption of water should not be more than 22% of its dry weight. Minimum compressive strength is equal to 7 N/mm2. Generally used for hidden brick work.

Third class brick-

Ground moulded and burn in clamp. These bricks are soft and of reddish / yellow colour with yellow tinge. They produce dull sound when struck with each other. Water absorption may be 25% of its dry weight. It can be used for unimportant work.

Fourth class brick-

These are over burnt & distorted bricks also called Jhama bricks. The compressive strength of these type of brick may be even 40 MPa.(High duty bricks).The ballast of this brick can be used in foundation work. Water absorption may be less than 5%.

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Properties of good brick-

Size and shape are uniform. Metallic sound when struck together.

It should not show any identical mark when sketched. Texture should be rough. Water absorption should be less than 20% of its dry weight. Minimum compressive strength should not be less than 10.5 N/mm2. Brick earth should be free from stone, grit, pebbles etc.

Scope:

- To uphold the hard waste from the sugar mills as a helpful manufactured goods.
- To deal with the removal of waste manufactured goods into construction untreated material.
- To support the waste goods as green material.
- To arrange the waste safety.
- To create the bricks which are power capable which is only possible solution to the Environmental concerns and natural assets preservation for opportunity generations.

OBJECTIVES

- Waste resources from sugar mill can be transformed in to construction material.
- Achieve maximum strength.
- It should be cheap.
- It should be ecological.
- The bagasse ash brick's compressive force may be compared to the fly ash Brick's compressive force.

METHODOLOGY

Ventilation of Waste Materials:

The desecrate substance are sun dried for a phase of 12 hours to remove the water content. The bagasse ash contains some quantity of water contented even it gets twisted in to ash. In this study we have replaced the bagasse ash as a substitute of cement, so we should evaluate some of the physical properties of bagasse ash and cement for superior presentation. The bagasse ash is subjected to sun dried.

(Figure:-2)

Sieve Method:

After the drying procedure the resources such as fine aggregate and bagasse ash are lightly sieved in IS sieve of 4.5 mm. the resources which passed in the IS sieve is in use as a reflection of usage; the retained supplies should not be used. It is important to do a sieve examination process for the

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proper binding of each material to form a ideal brick.It is necessary to sieve the fine aggregate and bagasse ash in IS sieve of 4.6 mm for the correct fastening of bricks. The below fig. shows the sieve procedure of the aggregate and bagasse ash ***(Figure:-3)***



Figure:-2



Figure:-3

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Addition of Materials:

The resources such as cement, sugar cane bagasse ash and fine aggregate are varied with water based on the mix up design. The cement is replaced by the bagasse ash.



Figure:-3Addition of materials

Forecasted Bricks



Figure:-4: Forecasted Bricks (Trial 1)



Figure: 5 Forecasted Bricks (Trial 2)

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TESTING METHODS

To determine the hardened properties of bricks standard tests like compression test on bricks for compressive strength, of brick, water absorption test and room temperature test were carried out at 7days and 28days of curing.

COMPRESSIVE STRENGTH

Compressive strength test was carried out for bricks with different mix proportion of carbon buster. The specimen is placed between two plywood sheets of each having 3mm thick and carefully centered in compression testing machine. The ultimate load is noted. The compressive strength is the ratio of ultimate load to the resisting area of brick loaded. An average of three specimens is taken as the compressive strength.

Compressive strength = Ultimate load/ Resisting Area

WATER ABSORPTION TEST:

(1) 24 hours immergence in cold water

Brick is oven dried at about 115C till it attains constant mass. Weight of this oven dried brick id determined (W1).Now the brick is kept in water for 24 hours. After 24 hrs, the brick is taken out from the water and weight is determined again(W2)

$$\% \text{ water } W = \frac{W2 - W1}{W1} * 100$$

$$W = \{(3.312 - 3.123)/3.123\} * 100$$

$$W = 6.05\%$$

Water absorption of the given bricks = 6.05%

$$\% \text{ water } W = \frac{W2 - W1}{W1} * 100$$

$$W = \{(3.312 - 3.123)/3.123\} * 100$$

$$W = 6.05\%$$

(2) 5 hrs boiling water test:

Oven dried brick is weight (W1).this oven dried brick is boiled in water for 5hrs and weight is determine (W3)

$$\% \text{ water} = \frac{W3 - W1}{W1} * 100$$

$$\text{Saturation coefficient} = \frac{\text{Water absorption by 24 hrs imergence}}{\text{Water absorption by 5 hrs boiling}}$$

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COMPRESSIVE STRENGTH TEST:

The subsequent steps were followed for compressive testing. First the irregularities of surface were uninvolved. The brick was located centrally on the underneath plate of the entire testing machine. When the superior plate of the entire testing machine was lowered downhill up to brick was seize tightly exclusive of any movement. When the load was practical till the ultimate strength of brick is obtained. And the compressive strength was calculated by this procedure

$$\text{Compressive strength} = \frac{\text{Maximum load failure}}{\text{Avg area of bed face (mm2)}}$$

Table:-1

SI. NO	Ratio	Fly ash or bagasse ash added (%)	Fly ash brick Compressive strength (N/mm2)	Bagasse ash compressive strength (N/mm2)
1	1:3	20 30 40 50	2.0 2.2 2.3 1.5	2.5 3.3 2.3 1.8
2	1:4	20 30	1.8 1.3	2.2 1.6
3	1:5	20 30	1.6 1.5	1.9 1.7

Compressive strength test

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CONCLUSION

Based on experimental investigations, the following explanations are made concerning of limited replaced bagasse ash:

Make use of bagasse ash in brick can resolve the removal problem, diminish cost and manufacture a 'greener' eco-friendly bricks for construction.

Environmental special effects of wastes and removal problems of desecrate can be reduced throughout this brick developing process. A improved compute by an original construction objects is formed during this research. This study helps in converting the non-precious bagasse ash into bricks and makes it expensive. In this investigate highest compressive strength can be attained. Compressive strength decreases on increase in percentage of bagasse ash as evaluate to fly ash.

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