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Partly Replacement of Cement, Sand by Sugarcane Ash and Bricks Bats On Normal Concrete

Rahul kumar Silote[1], Priyanka Dubey[1]

[1]*Department of Civil Engineering, RKDF School of engineering, Indore (M.P), India.*

Corresponding Author: rahulsilote72@gmail.com

Abstract: - The strength of concrete is determined by using Flexural test and strength test of M30 concrete. Compressive strength, Flexural strength, test of concrete mixes made with using waste over burn bricks bats material and sugar cane ash, determined strength at 7 & 28 days. The compressive and flexural strength have determined of percentage partially replacement in added M40 concrete. Results shows that the increase 20% and 25%compressive strength of the cement is high as compare to M30 cement concrete. The compressive &flexural strength also determines for M30 with mix SCBA and OBBB.

Compressive strength, and flexural strength test were performed and results were analysed to associate with above waste combinations. Based on experimental studies, the paper identifies waste combinations that demonstrate maximum compressive, split tensile and flexural strength of concrete. Relationship between compressive strength and split tensile strength, compressive strength and flexural strength is presented.

In the present work we added SCBA as replacement cement 10%,20%,30% and 40% its goes to higher value in 20% to 25% in partially replacement same as also increasing the partially replacement of OBBB as coarse aggregate The results clear indicate the strength of the material is decrease with increase percentage in concrete. 25 % give good result of concrete. Figure shows that the M30 material beams tested in flexural test for the 7 & 28 days' material. The results clear indicate the strength of the 28 days' material is higher as compare to 7 days' material. The flexural strength results clear indicate the strength of the beam also 25% gives good result is higher than the 10% & 25% mix of all waste material. To require more good quality of materials required good workmanship.

Key Words: — ***Using waste material in M30 concrete in 7, 28 days, in the case of partially replacement of cement and coarse aggregate by SCBA, OBBB on different percentage 10% ,20%,30% and 40%.***

I. INTRODUCTION

Concrete a building material made from a mixture of broken stone or gravel, sand, cement, and water, which can be spread or poured into moulds and forms a mass resembling stone on hardening.

Concrete is a composite material composed of fine and coarse aggregate bonded together with a fluid cement (cement paste) that hardens (cures) over time. In the past lime based cement binders were often used, such as lime putty, but sometimes with other hydraulic cements, such as a calcium aluminate cement or with Portland cement to form Portland cement concrete (for its visual resemblance to Portland stone). Many other non-cementitious types of concrete exist with different methods of binding aggregate together, including asphalt concrete with a bitumen binder, which is frequently used for road surfaces, and polymer concretes that use polymers as a binder.

Compressed stabilized soil or earth blocks are unfired blocks that are made of soil, stabilized with a binder, with or without the addition of fibres and compressed to form the block. The conventional fired bricks have been the mainstay of construction activities over the past several decades. However, in recent times, due to shortage of raw materials, rising material, and labour costs, the construction industry has started to look for other cost-effective alternatives. Traditional soil based constructions like soil blocks, rammed earth, and stabilized earth have again started to gain popularity due to their cost-effectiveness being the primary reason. The energy spent in firing of traditional bricks is close to ten times higher than typical cement stabilized soil blocks.

A. Objective

The main objectives of this research are

- To make and optimal the mixture compositions of grade of concrete M30 mix Concretes on the basis of their tensile and workability and also compressive test;
- Comparative experimental study of concreter M30 mix concrete in compressive, flexural test and also

test of workability of concrete on replacement different percentage of sand and aggregate by sugarcane baggers ash, waste brick bats.

- To construct model, the tensile actions of M30 grade of concrete with different combinations of waste material, on the basis of performed its properties test.
- To perform a study on its utilization in the engineering practice and to assess this utilization from engineering, technical and economical point of view.

B. Formulation of Research: Stage of Work

In stage formulation, the coarse aggregate is partially replaced by brick bats in different percentages 0%, 10%, 20%, 30%, and 40%, as shown in the 5 batches are prepared in different proportions including conventional concrete mix. Cubes and beams are casted for determining compressive strengths, flexural strengths, and workability Test of Concrete respectively at 28days.

II. MATERIALS USED

- Cement (OPC)
- Fine sand
- Coarse aggregate
- Water
- Sugar cane baggers ash
- Over burn brick bats

A. Scope

The primary objective of this research is to study the influence of partial and complete replacement of coarse aggregate with brick bats, and to compare it with the compressive and flexural strength of ordinary M20 concrete. Also trying to find the percentage of brick bats replaced in concrete that makes the strength of the concrete maximum. Brick bats are usually considered as waste material. So, by replacing coarse aggregate with brick bats, proposing a method that can be of great use in reducing pollution to a great extent.

III. EXPERIMENTAL ANALYSIS

In this section, explain the testing of materials which are used in this research study. The testing of materials included cement testing, sand; aggregate and concrete (M-30) testing using consistency test fineness test etc. which gives helps for the mix design and also gives behaviors of materials?

A. Methodology

The numbers of methodology are available. In this work used the following stages

i) Cement

a) Laboratory testing

ii) Sand

a) Silt Content

b) Specific gravity of sand

c) Sieve analysis

IV) Aggregate

a) Sieve analysis

b) Flakiness test

c) Crushing Test

d) Elongation Test

v) Mix Design M-30 Grade

vi) Fresh concrete test like workability test slum cone test

B. Cement

Laboratory Testing:

In this test are preform in laboratory, find out the quality of cement

Consistency test:

To determine the initial setting time or final setting time of cement and strength a parameter Known as standard consistency have been to be a used. The standard consistency of a paste of cement is define to the consistency which approve to a Vicat plunger of a 10mm diameter or 50mm length to penetrate at a deepness of 33-35 mm from to top of the mould. IS: 5513-1976.

Fig.1. Consistency test

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C. *Procedure*

- Take an about 400 g is cement in a tray and is mixed with a known percentage of water
- The paste of 400 g of Cement paste is filled into a Vicat mould.
- The mould is placed, on the glass plate, and plunger is fall down slowly- slowly and touch the surface of paste of cement, and released, and has been penetrate in

IV. TESTING AND RESULTS

Concrete is required to be tested in both fresh and hardened states. Fresh concrete is tested for workability to determine its capacity for satisfactory placing. The analysis of fresh concrete is required to judge the stability that is to identify segregation of the concrete mix, uniformity in mixing and to determine the proportions of the ingredients of concrete actually used. The testing of hardened concrete specimens is required for checking the quality and compliance with the specifications.

A. *TESTING ON CONCRETE*

The following topics are discussed

- Compressive Strength of concrete
- Hardened behaviour of concrete and also fresh
- The ability to withstand wear of concrete
- Allowable tensile and compression stresses in concrete

B. *Tests in Concrete M30 Concrete in Stage*

To achieve the aim, the whole work is divided in III stage, Stage-I, stage-II. And stage –III.

In Stage-I, to testing of standard concrete where no changes of concrete

In stage-II percentages.0%, 10%, 20% 30, and 40 %. 30 cubes, 30 beams, with 12mm diameter steel rod are casted. Replacement of cement by sugar cane baggers ash

In stage-III, the coarse aggregate is partial replaced by marble Dust at different percentages. 0%, 10%, 20% 30, and 40 %., 30 beams, 30 cubes with 12mm diameter steel rod are casted. And then various test is like performed as per Indian Standard. Compression test on cubes, flexural strength test on beams, split tensile strength test on cylinder, bond strength test on cube with embedded road and finally stress-strain curve test of concrete on cylinder.

C. *Strength of Concrete*

Obviously, the strength of any structure, or part of a structure, is important—the degree of importance depending on the location of the structural element under consideration. The first-floor columns in a high-rise building, for example, are more important structurally than a non-bearing wall. Loading is more critical, and a deficiency in strength can lead to expensive and difficult repairs or, at worst, a spectacular failure. Strength is usually the basis for acceptance or rejection of the concrete in the structure. The specifications or code designate the strength (nearly always compressive) required of the concrete in the several parts of the structure. In those cases, in which strength specimens fail to reach the required value, further testing of the concrete in place is usually specified.

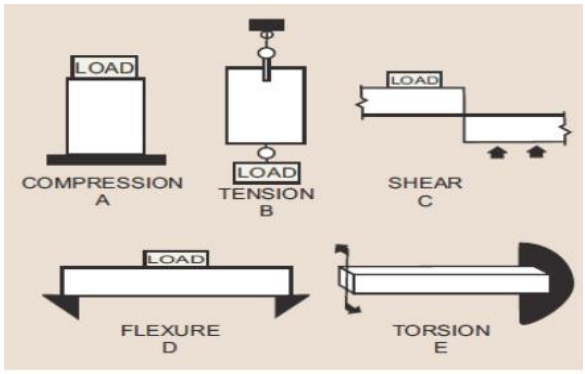

Fig.2. concrete structure is subject to many kinds of loading besides compressive A. compression B. tension is pulling part C. shear is a cutting or sliding. D flexure is a bending. E torsion is a part of twisting.

- *Graph Comparison Stage-I, To Testing of Standard Concrete Where No Changes of Concrete*

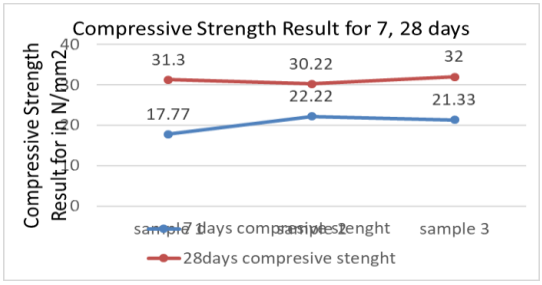

Fig.3. Compressive Strength Result for 7, 28 days (Stage 1)

- *Partially replacement cements by sugar cane baggers ash in compressive testing in stage-II percentages.0%, 10%, and 20% 30, and 40 %. For 7 days curing result*

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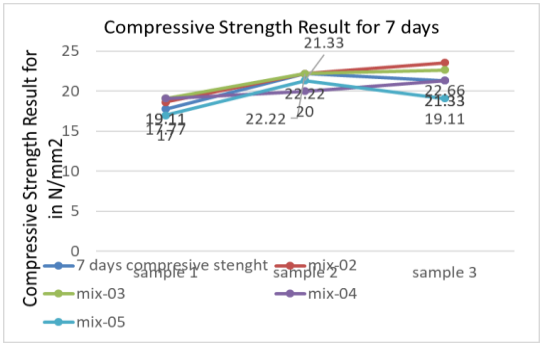

Fig.4. Compressive Strength Result for 7 days partially percentages.0%, 10%, 20% 30, and 40 %where mix-1, mix-2, mix-3mix-4and mix-5 respectively

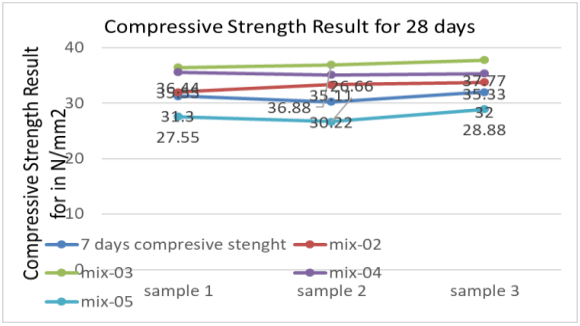

Fig.5. Compressive Strength Result for 28 days partially percentages.0%, 10%, 20% 30, and 40 %where mix-1, mix-2, mix-3mix-4and mix-5 respectively

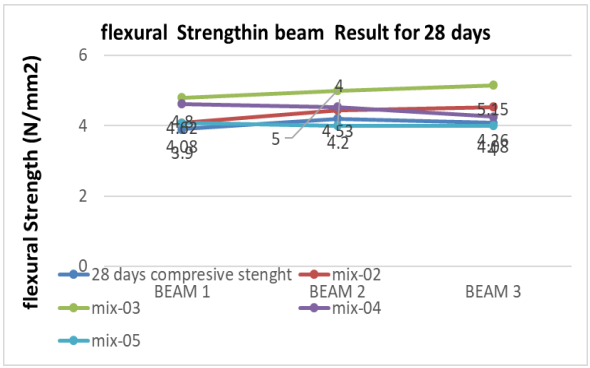

Fig.6. flexural Strength Result for 28 days partially SCB, WOBBBpercentages.0%, 10%, 20% 30, and 40 %where mix-1, mix-2, mix-3mix-4and mix-5 respectively

V. Comparison between On Average Value Of Compressive Strength In Different Percentage Respectively 7 Days And 28 Days By Replacement Of SCBA

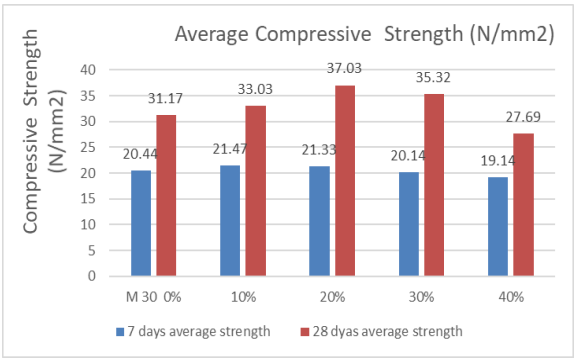

Fig.7. comparison between partially replacement cement by sugar cane baggers ash in compressive testing .0%, 10%, 20% 30, and 40 % where mix-1, mix-2, mix-3 mix-4 and mix-5 respectively.

A. Compare average value Flexural (modules of rupture) Strength Partially replacement cement by sugar cane baggers ash and also replacements coarse aggregate by waste over burn brick bats

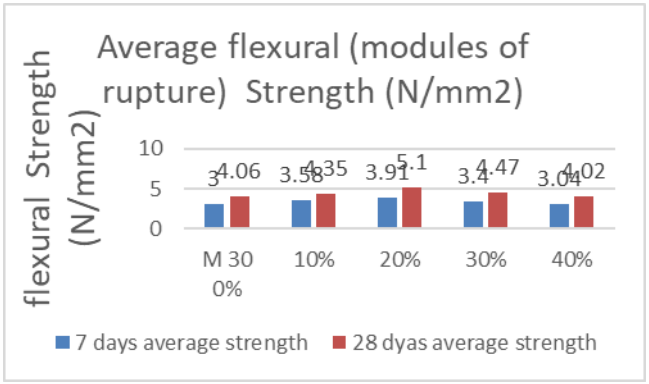

Fig.8. comparison between partially replacement cement by SCBA and coarse Agg. By WOBBB in flexural (modules of rupture) testing .0%, 10%, 20% 30, and 40 % where mix-1, mix-2, mix-3 mix-4 and mix-5 respectively

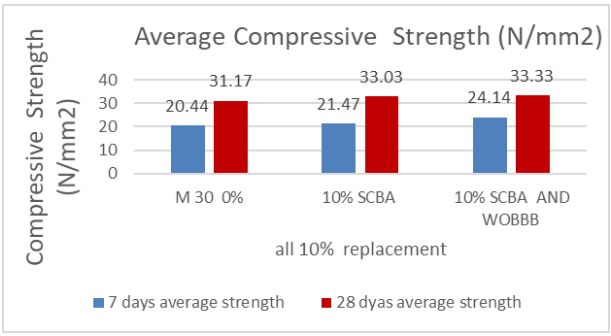

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Fig.9. comparison between partially replacement cement by SCBA and coarse Agg. By WOBBB to all 10% replacement

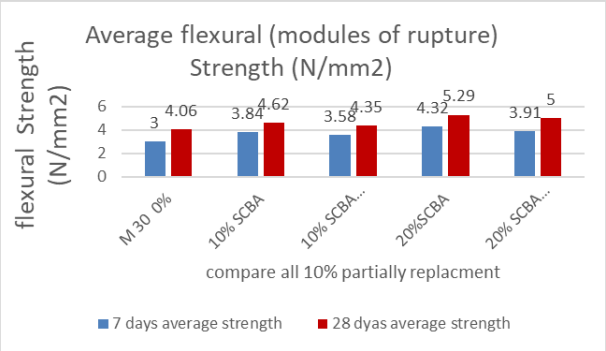

Fig.10. comparison between partially replacement cement by SCBA and coarse Agg. By WOBBB in flexural (modules of rupture) testing .0%, 10%. And 20%

VI. Result Discussion& Conclusion

The following result shows individual value for 7 days and 28 days compressive and two-point flexural strength. For compressive strength of concrete, the M30 grade of concrete has been designed for preparing the concrete cubes as per IS 10262:2009 revised and we prepared cubes and beam and tested on compressive machine and two-point load flexural machine as shown in above picture. Where find clear whenever we increasing percentage of partially replacement than decreasing at 30% of replacement in both of case we also know the cement is a binding material for concrete or other materials than we cannot changes more but we can say for OBBB are used at 40% of replacement.

The following conclusions may be drawn from the study of the effect of SCBA and OBBB replacement on the concrete properties.

- The addition of SCBA & WOBB has improved the compressive strength, split tensile strength and flexural strength of concrete.
- The flexural strength test on beams results show that the ultimate load carrying capacity of the beam increases by 20% for 30% replacement of SCBA and OBBB.
- The slump value of SCBA and OBBB concrete lies between 75 to 100 mm.
- Water absorption value of SCBA and OBBB concrete is increasing up to 10%. After that the surface water absorption is increased rapidly.
- The flexural strength results clear indicate the strength of the beam 20% and 30% gives good result is higher than the 10% & 40% mix of all waste material. To required more compaction required good workmanship. But we can say that on 35% of replacement using of SCBA and OBBB than may be gives good result.
- The same as on compressive test strength of cubes results clear indicate the strength of the beam 20% and 30% gives good result is higher than the 10% & 40% mix of all waste material.

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