e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:04/Issue:04/April-2022 Impact Factor- 6.752 www.irjmets.com

EXPERIMENTAL STUDY ON AGROWASTE BLOCK USING AGRICULTURAL AND INDUSTRIAL WASTE

Abhay Singh[*1], Neha Gad[*2], Nikita Kevale[*3], Kshitij Waghule[*4], Swara Bambade[*5], Shrikant Varpe[*6]

[*1,2,3,4]Student, Department Of Civil Engineering, NHITM, Thane, India.

[*5]Asst. Professor, Department Of Civil Engineering, NHITM, Thane, India.

ABSTRACT

Environment-friendly materials attract attention while the development sector causes excessive world energy consumption and emission of greenhouse emission. In this paper, the impact of the different sizes of agrowaste fiber, compressive strength and other parameters of the light weight block are studies. Sample of agrowaste fibers (0-5, 5-10 and 0-15)mm were used in this experiment. The block was based on lime and slag as an binder with the constant ratio of 7.69%, 61.53% and 38.46% for Agrowaste, Binder and water respectively. Compressive strength, Split tensile and flexural strength were tasted after 28 days of hardening. Comparative Study are going to be conducted between AAC block and agrocrete block with regard to captures carbon emissions.

Keywords: Agrocrete Blocks, Carbon Emissions, Light Weight Blocks.

I. INTRODUCTION

Construction is that the second largest business in India, solely second to agriculture. With fast urbanization and exponential growth of population, there's a large demand for housing and different subsidiary associated with housing making a shortage of typical building materials. the assembly of standard building materials consumes plenty of energy and pollutes air, water and land. Thus, to satisfy the ever-increasing demand of building materials, new property materials area unit required. At a similar time, there's a growing issue of solid wastes from agriculture, that became a significant supply of pollution not solely in India, however in the majority developing countries.

The main aim of this analysis is to seek out a constructive methodology to show solid, agricultural wastes into viable building materials, thereby addressing each pressing problem at an equivalent time. The current paper explores the potential application of 'agro-waste', like fodder or straw stubbles, leftover wood, et cetera, because the ingredient for various property construction materials within the variety of bricks. supported the supply of agro-waste materials, these property blocks are changed to suit the native market and building construction designs. the appliance of agro-waste as a construction material may end up within the reduction of the usage of natural resources furthermore as of energy consumption. At an equivalent time, it will boost the farmer's financial gain, World Health Organization will sell the leftover stubbles rather than burning them, thereby reducing pollution. to attain this goal, method the method} of up-cycling (the process of changing waste materials into new product of higher environmental worth than in their previous use) is accustomed convert the agro-waste into usable blocks by combining it with lime, fly ash and scoria.

Since the majority of property infrastructure are enforced by civil engineers, there must be an outlined context for eco-efficiency this will be accomplished on associate ethical basis. In step with the ASCE Code of Ethics, "Engineers ought to be committed to up the atmosphere by adherence to the principles of property development therefore on enhance the standard of lifetime of overall public." whereas this appears to be associate invariably broad definition, it's helpful as a conceptualization of what must be accomplished. additionally, it effectively relays the innovative role that civil engineers can play in relation to eco-efficiency.

II. LITERATURE REVIEW

1. Bio-bricks as compared to burnt clay bricks is not only sustainable but also acts as a carbon sink as it fixes more carbon dioxide than it is produced during its lifecycle. The net greenhouse gas emission during the life cycle of one bio-brick block is Zero Percentage.

2. The analysis behind the utilization of hempcrete. Hempcrete may be a property artifact that's created with a low environmental impact that removes waste production, decreases each energy use and therefore the consumption of natural resources

3. The presence of fibers within the hemp, the improvement of the granular to binder quantitative relation, and therefore the compaction throughout the casting method. Slight compaction results in a coffee resistance to compression as compared with the standard building materials.

4. Hemp can be used as a building material in combination with lime and cement. The effects on compressive strength of pre-mixing the binder or creating perforations in the test specimens were also investigated. It is also

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found that the strength of concrete improves if cement is also added to it.

5. The impact of mean size of unsymmetrical hemp shives particles (length) on compressive strength and alternative parameters of light-weight composites. Composites supported MgO-cement as a binder with a continuing quantitative relation of hemp shives (40 vol. %) were ready. Compressive strength with the shortest hemp shive slices reaches nearly double the worth specified for the longest hemp shive slices.

III. METHODOLOGY

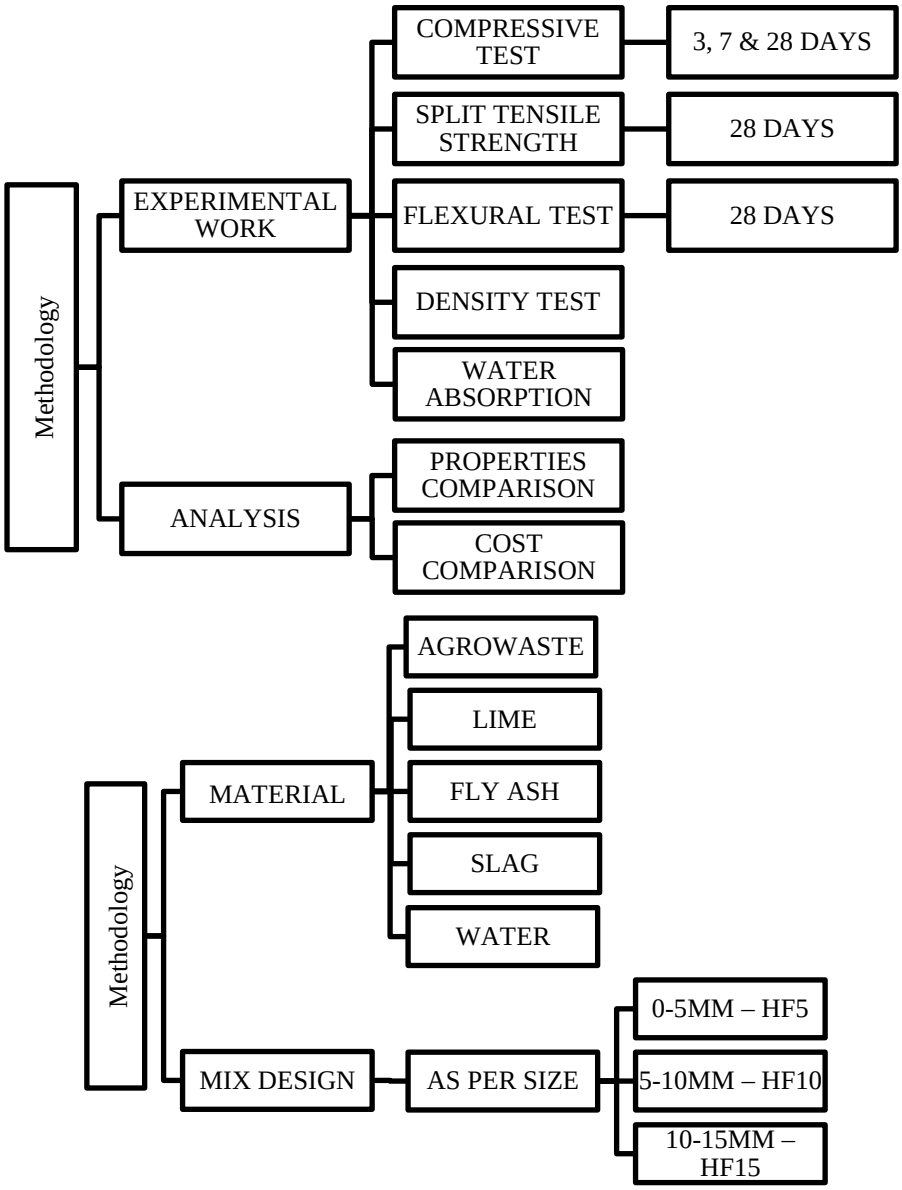

Fig 1: Methodology

IV. MATERIALS AND MIX DESIGN

Tests Conducted on Materials

1. Lime

1.1 Visual examination

Tests were conducted as per IS 1624:1986 (METHODS OF FIELD TESTING OF BUILDING LIME)

The lime sample tested was found to be white in color and had powdery look. Therefore, it absolutely was classified as class -C lime, principally used for white wash.

1.2 Ball check

Signs of disintegration at intervals a couple of minutes show that lime could also be of class C. little or no growth and various cracks generally seen on the surface show that lime could also be of class B or E. No signs of

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disintegration beneath water show that lime could also be of class A.

1.3 Impurity take a look at

The extent of residue calculated as share of the initial mass of fabric provides a thought regarding the burning potency of IS 162. The presence of unreactive parts within the lime applied as given below: a) Class Band F can have residue less than ten p.c, and b) category C and D wiJ1 have residue less than five p.c.

1.4 Setting time

The initial setting time=60 min. the ultimate setting time =720min

2. Agrowaste

2.1 Density - 1150 Kg/cm2

Table 1. Proportion Of Materials

Materials	Weight (KG)	Content (%)	Mix Design
Agrowaste	1	7.69	1
Binder (Lime, GGBS & Fly Ash)	4 + 2 + 2	61.53	8
Water	5	38.46	5

Fig 2: Sizes of Agrowaste

V. CASTING PROCESS

Fig 3: Agrowaste

Fig 4: Mixing materials

Fig 5: Tamping

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Fig 6: Cubes Casted

VI. RESULT AND DISCUSSION

Compressive Strength Result

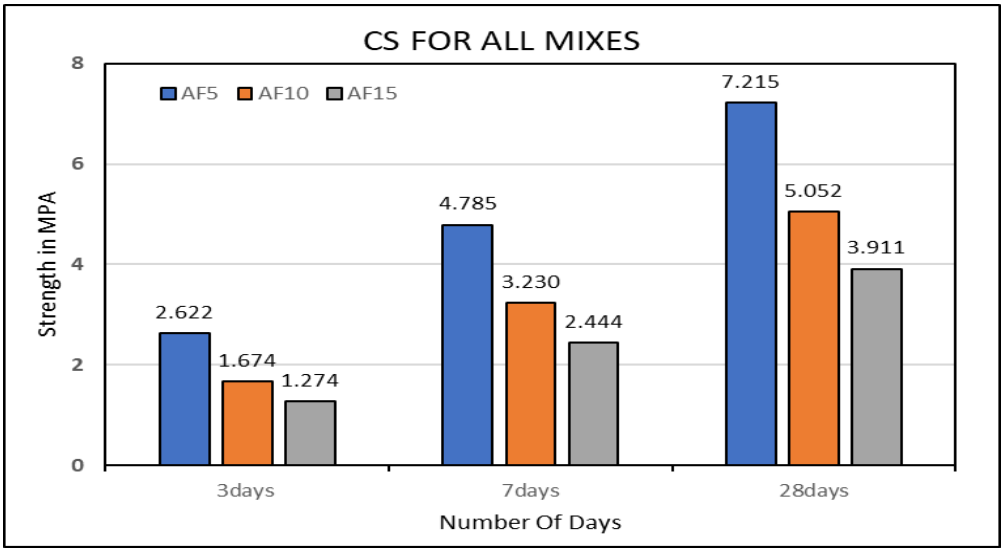

Fig 7: Compressive strength result

The results for compressive strength was found out to be 2.622,1.674,1.274 for 3 days for HF5, HF10, HF15 respectively When compared to AF5 there was percentage decrease by 36.16 and 51.41 for AF10 and AF15 resp. It was observed that with the increase in length of hemp size, the strength of the block goes on decreasing.

Split Tensile Strength test

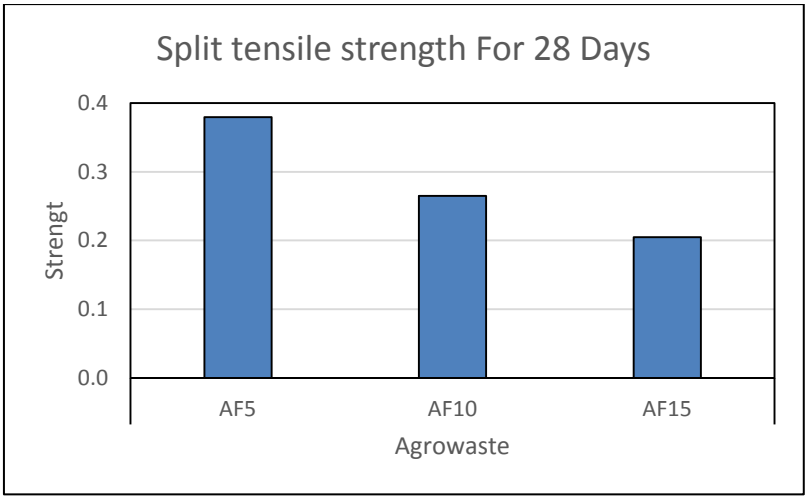

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Fig 8: Split Tensile Strength Result

The split tensile strength of the blocks was found out to be 0.38, 0.26 and 0.20 for AF5, AF0 and AF15 respectively. The split Tensile strength also reduces when the fiber size increases.

Flexural Strength Test

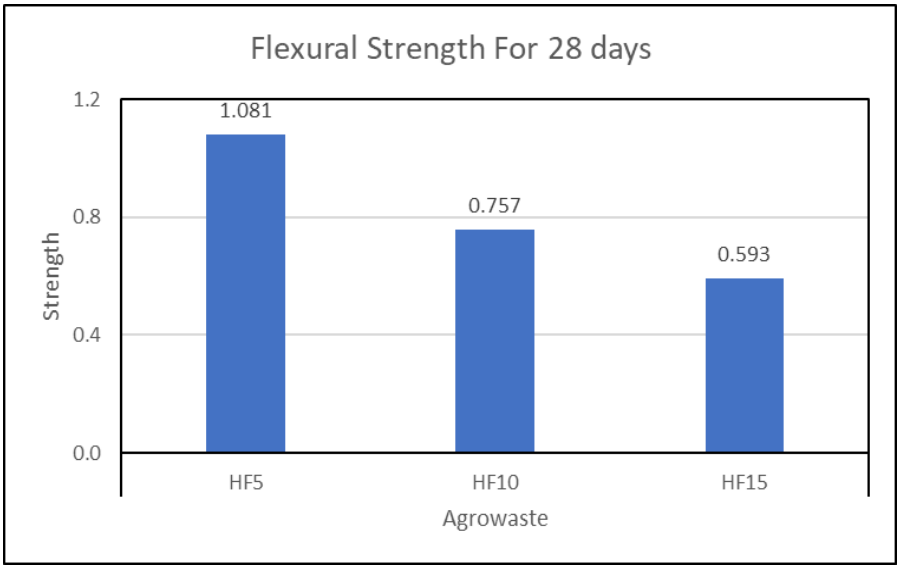

Fig 9: Flexural Strength Result

The flexural Strength of AF5, AF10 and AF15 Were found to be 1.081, 0.757 and 0.593 respectively. The strength decreases when size of fiber increases.

VII. CONCLUSION

Compressive strength of Agrowaste blocks was less than that of AAC block by 84.78 %. For red brick, it is more than 4.5% at 28 days. Increase in value of density, Compressive strength, Flexural & split tensile strength of composites after 28 days of hardening with decreasing length of agrowaste fiber was found. The agrocrete blocks are light weight and captures carbon emission in the process.

The use of agrowaste blocks is still very limited and there is a scope of further research in manufacturing these blocks using Agrowaste and industrial waste materials. It also offers solution to the problem of waste disposal as well as eco-friendly environment for construction instruction.

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