# A Study of Manufacturing Concrete Block using Agro-Waste

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## Abstract

High demand of natural resources due to rapid urbanization and the disposal problem of agricultural wastes in developed countries have created opportunities for use of agro-waste in the construction industry. Many agricultural waste materials are already used in concrete as replacement alternatives for cement, fine aggregate, coarse aggregate and reinforcing materials. Some of the agro-waste materials, which are used as a partial replacement of fine aggregate in concrete. It has been seen that the agro-waste concrete containing groundnut shell, oyster shell, cork, rice husk ash and tobacco waste showed better workability. Agro-waste concrete containing bagasse ash, sawdust ash and oyster shell achieved their required strength by 20% of replacement as fine aggregate, which were maximum among all agro-waste type concrete. Close relations were predicted among compressive strength, flexural strength, tensile strength, ultrasonic pulse velocity and elastic modulus of agro-waste concrete. We can achieve every possible new types of constraints which are use for better type concrete block production system in which it includes all calculation.

**Keyword- Agro-Waste Concrete, Quarry Dust, Waste Fiber, River Sand, Fine Aggregate, Rice Husk Ash, Saw Dust Ash, Cement**

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## I. INTRODUCTION

India's construction industry will continue to grow in the next decades.
According to company's latest report on Indian construction market sector will grow at CAGR of 4.16% from now until 2021. Concrete is an important elements in construction coarse aggregate, sand and cement are used in concrete. This material is produced from natural resources. Now a day's there are many solid wastes are generated by many activity like, industrial, domestic and agriculture activity. There are approximately 600 MT agriculture waste are generated in India. The disposal of agriculture waste is main problem. So that the disposal of agriculture waste is done by reuse, recycle and reduces

There are many agriculture waste like, sugarcane bagasse ash, groundnut shell, oyster shell, saw dust, rice husk ash, cork waste, coconut shell etc. This waste are likely use in manufacturing of concrete. The waste materials from rock after processing for different purpose having sizes less 4.75 mm is known as quarry dust which size is equivalent to river sand.

### *A. Rice Husk*

Rice husk is one of the fundamental wastes obtain from the external covering of rice grains amid he processing procedure. The rice husk has no useful application and is prepared as a waste material that creates the pollution problem. Because of low nutrition property of rice husk, it has been utilized generally as fuel for rice plants and electric power plants as a compelling technique to reduce the volume of rice husk waste. Many researches in the past had use rice husk ash as a cement replacement material in concrete.

### *B. Sawdust*

The sawdust use for making lightweight concrete has received some over the past years. Sawdust ash is the right choice as fine aggregate in concrete. The shape of the sawdust is to be treated as a waste material. The sawdust ash is use in the concrete and reported as sawdust processed unique characteristics.

## II. AIM

"A study of manufacturing concrete block using agro-waste and analyze different properties of it".

## III. OBJECTIVE

- Agricultural waste are used as a partial replacement of fine aggregate in concrete
- To design of M20 grade concrete
- To check the property of concrete

- To find optimum replacement of agro-waste in concrete

## IV. LITERATURE REVIEW

The use of agro-waste material like as groundnut shell ash, saw dust ash, rice husk ash, coconut shell ash, oyster shell ash etc are used to be in production of concrete with better durability, workability then original concrete. It also reduce environmental problem. Ash replace with cement also deal with costing as compared to use 100% cement to use 10-20% ash with cement in ordinary Portland cement. Partially replacement waste materials of concrete may decrease cost and reduce environment pollution an also protect the environment from agro-waste like rice husk, saw dust, ground nut shell etc.

The agricultural wastes used as fine aggregate in concrete are sugarcane bagasse ash, ground nut shell, saw dust, rice husk ash, and cork and tobacco waste. The difference of this agro-waste are the place from where they collected and to convert into a fine aggregate. The purpose of this review is study of the different property like workability, durability, mechanical properties of agricultural wastes used as the partial replacement of concrete. When also studied the relationship between the concrete made using different agricultural waste materials and environmentally friendly concrete. This review some of the agro-waste materials which are used as the partial replacement of fine aggregate in concrete.

Recycling of such wastes into sustainable, energy efficient construction material is a suitable solution for the problem of pollution and natural resource conservation for future generation. The generated about hydrothermal performance will be beneficial to the manufactures and researches to develop innovative construction materials.

## V. METHODOLOGY

The concrete commonly used to make concrete blocks is a mixing of ordinary Portland cement, water, sand and gravel. But in this research work some proportion of cement and send is replaced with agro-waste. Different steps are included to prepare agro-concrete block. Which are shown below:

At first find different wastes. Which can be used as a partial replacement of cement and cement with sum agro-waste.

After knowing different agro-waste can be used in manufacturing concrete block to check

From this agro-waste classified different ways according to strength using different test such as specific gravity, finesses modules, bulk density and water absorption.

The physical properties of material and perform the test of specific gravity, finesse modulus, bulk density, and water absorption of material. The result is given below:

| *Sr. No* | *Test* | *Rice Husk Ash* | *Saw Dust Ash* | *Groundnut Shell Ash* | *Cement* | *Sand* | *Aggregate* | *Quarry Dust* |
|---|---|---|---|---|---|---|---|---|
| *1.* | *Specific gravity* | *1.85* | *3.7* | *2.1* | *2.94* | *2.4* | *2.65* | *2.15* |
| *2.* | *Finesse modulus* | *-* | *1.5* | *-* | *1.4* | *2.50* | *5.70* | *3.27* |
| *3.* | *Bulk density* | *107* | *1193* | *257.5* | *1232* | *1511* | *1671* | *1612* |
| *4.* | *Water absorption* | *-* | *-* | *1.86* | *-* | *1.73* | *-* | *-* |

*Table 1: Properties of materials*

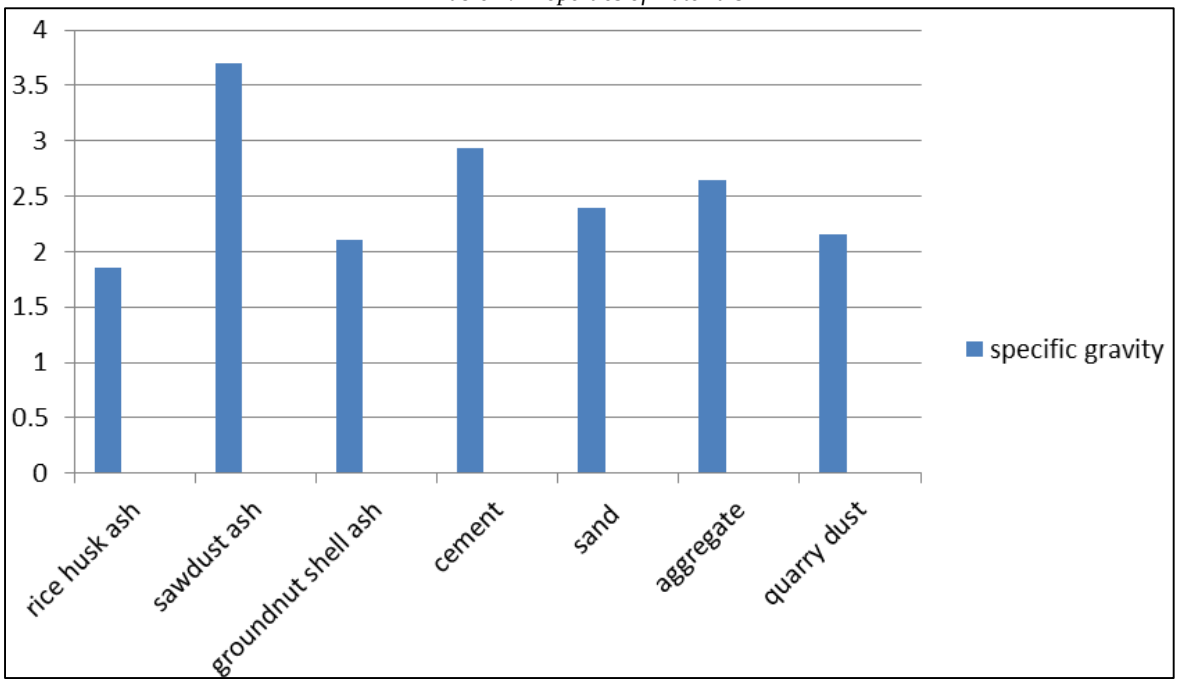


Fig. 1: Specific gravity

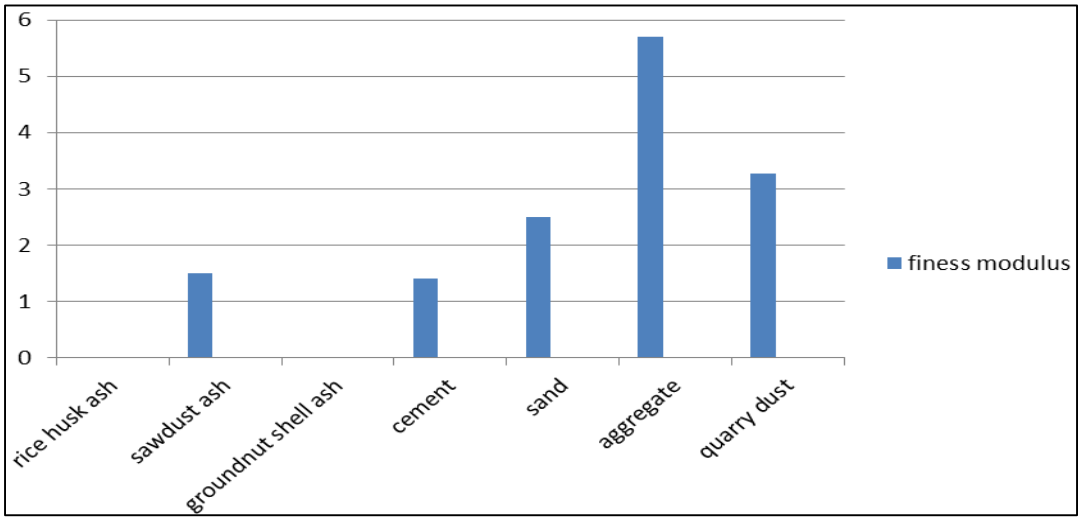


Fig. 2: Finesse modulus

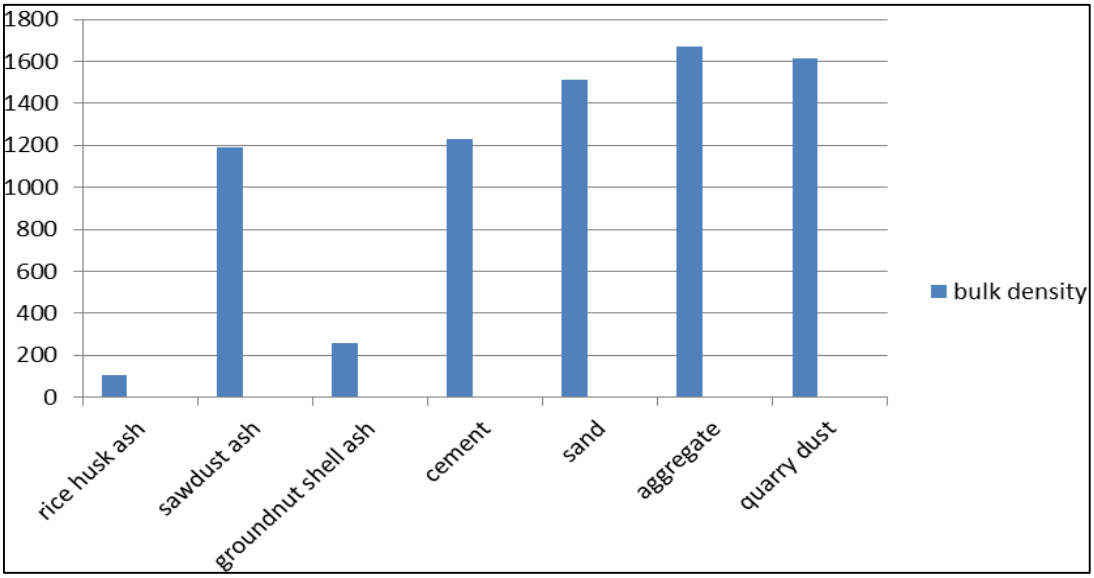


Fig. 3: Bulk density

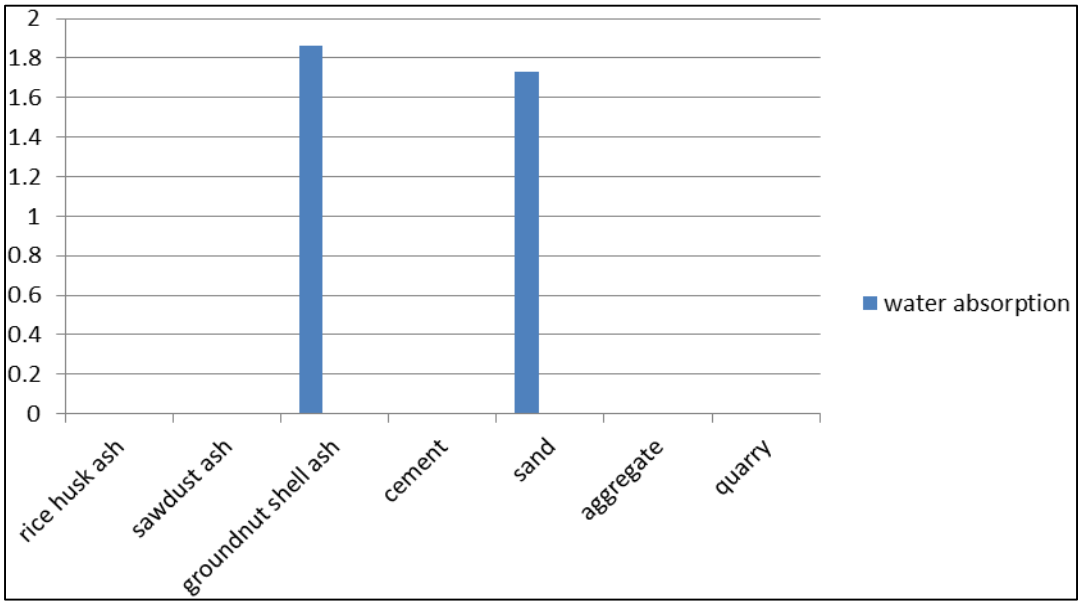


Fig. 4: Water absorption

## VI. CONCLUSION

For a research paper and experimental studies on fine aggregate replacement by agro-waste in concrete and self-compacting concrete have been reviewed by replacing some proportion of material such as,
Saw dust ash replaces in cement
Rice husk ash replaces in cement
Quarry dust replaces in sand etc.
And for a result analysis, we get the maximum strength of concrete block by 10 % replacement as a fine aggregate, which were maximum strength among all agro-waste type concrete.

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