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# A Review Paper on strength characteristics of concrete with partially replacement of cement by Rice Husk Ash and Fly Ash

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## ABSTRACT

Rice husk is one of the waste materials in the rice growing regions. This not only makes the purposeful utilization of agricultural waste but it will also reduce the composition of energy used in the production of cement. Since the agricultural by products such as Rice hush can be partially replaced of cement because of their pozzolanic behavior. Rise husk ash contains as much as 80-85% silica which is highly reactive, depending upon the temperature. Therefore partially replacement of cement by Rice Husk Ash in cement concrete.

Fly ash is comprised of the non-combustible mineral portion of coal. When coal is consumed in the power plant, it is first ground to the fineness of powder. Blown into the power plants boiler, the carbon is consumed, leaving molten particles rich in silica alumina and calcium.. The compressive strength is recorded after the 7, 14 and 28 days curing. Then normal concrete cube and RHA, Fly Ash concrete cube test in compressive testing machine, comparing the strength between them.

**Keywords:** Rice Husk Ash, Fly Ash, Ordinary Portland cement.

## I. INTRODUCTION

To reducing the cost of construction of concrete structures by added some waste materials such as Rice Husk Ash, Fly Ash with increasing its compressive strength as compare to the normal concrete (without added RHA and Fly ASH).Rice Husk Ash is obtained from burning of Rice Husk which is the byproduct of rice milling. Rice Husk Ash contains as much as 80-85 % silica which is highly reactive, depends upon the temperatures of the atmosphere. It is considered as a highly pozzolanic materials. Ash is used as like as fine powder because of similar property of cement.

## II. LITERATURE REVIEW

Replacement of cement with Rice Husk Ash leads to decrease in the compressive strength improved the workability and achieved the target strength at 10% replacement for both the grades of concrete.By Ravande KishoreV. BhikshmaP.jeevana Prakash2011 published by Elsevier ltd.As the replacement of cement by RHA in concrete increases, the workability of concrete decreases by 27% slump and 9% compaction factor.

Replacement with 25% RHA result in drastic enhancement of the permeability properties of blended concrete compared to that of in ordinary concrete by Seyed Alireza Zareei, FarshadAmeri, Farzan Dorostkar, and Mojtaba Ahmadi Case studies in construction material 7 (2017) 73-81.ISSN:1991-8178

Compressive strength of mortar and concrete increase when cement is partially replacement by RHA.Due to active amorphous silica content present in RHA by M.N.N. Khan, M. Jamil, A.B.M.A, Kaish and M.F.M, Zain. This active silica reacts with hydration products of cement and produce secondary C-S-H gel, www.ajbasweb.com

The fine aggregate content is reduced but the coarse aggregate content is deliberately the same, the water is reduced and the density is reduced because of the lower density of fly ash compared with cement by Jagdish Virupakshi Patil,Volume: 04 Issue: 11| Nov-2017 www.irjet.net p-ISSN:

## III. PROPERTIES OF RHA AND FLY ASH

RHA is that the highest amorphous silica could be obtained by burning the rice husk at the temp.range of 500-700 0c and the specific surface area up to 150 sq.m per kg.The Specific gravity of rice husk ash is 2.1 and produced after burning of Rice husk (RH) has high reactivity and pozzolanic property. IS 456- 2000 [8], recommends use of RHA in concrete but does not specify quantities.

Fly ash used was obtained Indorama Synthetics India limited, Nagpur, Maharashtra in India. Fly ash is one of the residues generated in the combustion of coal. Fly ash is generally captured from the chimneys of power generation facilities, whereas bottom ash is, asthe name suggests, removed from the bottom of the furnace. In the past, fly ash was generally released into the atmosphere via the smoke stack, but pollution control equipment mandated in recent decades now require that it be

**Figure 1.1.** concrete mixing with RHA and Fly Ash

aptured prior to release. But all fly ash includes substantial amounts of silica (silicon dioxide, SiO2) (both amorphous and crystalline) and lime (calcium oxide, (CaO). Fly ash is commonly used to supplement Portland cement in concrete production, where it can bring both technological and economic benefits, and is increasingly finding use in synthesis of geopolymers.

## IV. MATERIALS

### 4.1 Cement

Ordinary Portland cement of 53 grade is used in concrete. Cement used has been tested as per IS 10262 and 456-2000.

### 4.2 Coarse aggregateandFine aggregate

The maximum size of coarse aggregate should be 20 mm and minimum size should be 10 mm. The coarse aggregate with angular in shape and the rough surface texture is used. The fine aggregates should be used from 4.75 mm to 150 micron.

### 4.3 Water

Locally available portable water confirming to standard specified in IS 456-2000 is use.

## V. METHODOLOGY

1. After completion of data required for theconcrete with partially replacement of cement by Rice Husk Ash and Fly Ash then completing the mix design work was done.

2. Replacement of cement by RHA and fly ash as 10%, 15%, 20% in the concrete cubes.
3. Now a days, concrete cubes are under water tank for the curing.
4. Allthe concrete cubes made by ordinary Portland cement and replacement of cement by RHA and Fly Ash curing is in same water or same water tank.
5. After completion of curing for the 7 days, 14 days, 28 day, cubes are tested on compressive testing machine (CTM).
6. Then to check the characteristics strength of concrete cubes RHA and Fly Ash.
7. Then to comparing the strength between them

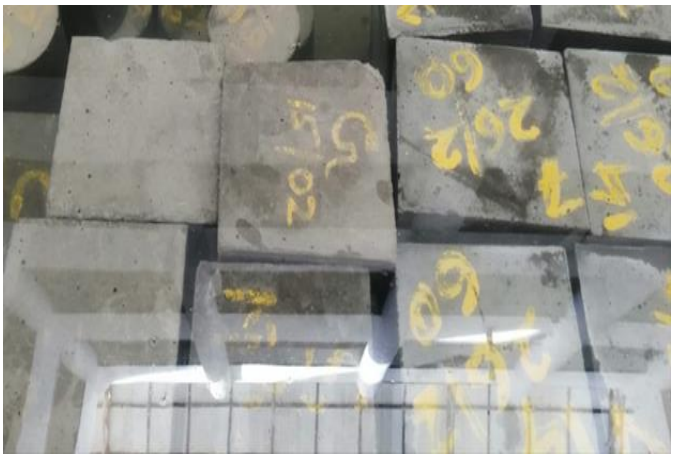

**Figure 1.2.** Cubes in curing tank


**Figure 1.3.** Compression testing machine

## VI. EXPECTED OUTCOME

1. Reduction of environment pollutants and economy in concrete construction was possible using RHA as partial replacement of cement.
2. RHA mixed concrete develops light weight concrete as compared to normal concrete as its density is less.
3. Combined replacement of Fly Ash and Rice Husk Ash showed higher compressive strength than only replacement of concrete mixes with RHA

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