

Partial Replacement of Cement Concrete with Rice Husk Ash

S. Vinoth Kumar, Anish . C, Chitra. R

Abstract: To concentrate on the conceivable outcomes of utilizing waste materials from various assembling exercises in the arrangement of cement. The rice husk powder is acquired by consuming rice husk slag in a controlled way without causing natural contamination. The utilization of this waste was proposed in various rates both as an expansion to and rather than bond for the generation of solid blends. In the examination the utilization of rice husk powder has been researched in the solid blends as concrete materials. The examination demonstrated that rice husk fiery debris which are in the residue from could be utilized as cementations material in solid blends where they are accessible and the expense to transportation is lower than common solid materials. The solid is readied containing 10, 20, 30, 40% misuse of rice husk powder with bond contrasted with the absolute nature of ordinary cement. The readied blends were than concentrated in term of their properties both in new and in solidified state. Specifically, test were led on solidify cement relieved at various occasions in the request to decide their compressive quality with and without incomplete substitution of rice husk powder in concrete were resolved 7days, 14days, 28days

Keywords – Waste Materials, Solid Blends, Transportation

I. INTRODUCTION

The biological pattern targets restricting the at utilization of normal crude materials in the field of structure materials and consequently there is an expanded enthusiasm for the utilization of elective material (squander) from industrials exercises, which presents critical focal points in financial aspects, vivacious and conditions terms[31]-[34]. Cement is never again made of total, Portland bond and water as it were. Regularly, if not generally it needs to fuse in any event one of the extra fixings, for example, admixtures, valuable concise material or strands to upgrade its quality and sturdiness. The principle worry of utilizing pozzolanic waste was viability as well as to improve the properties of cement, particularly strength[1]-[8].

A. Objectives

- To study the physical properties of rice husk slag.
- To decide the normal for the rice husk fiery remains with

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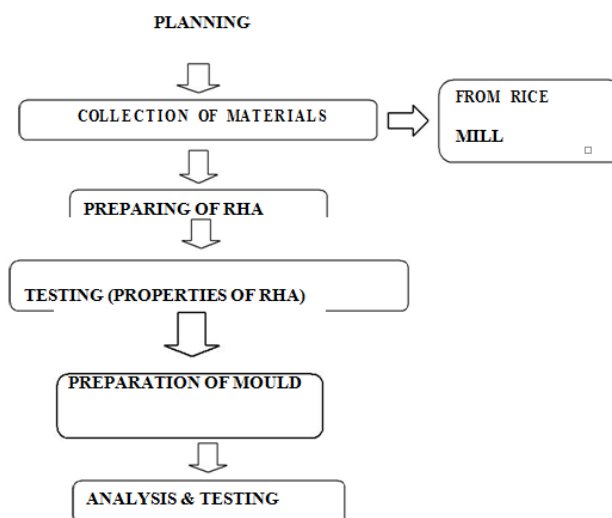
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fundamental test.

- To analyze the quality of ordinary cement and the proposed rice husk powder blended cement.
- To analyze the economy of typical cement and the proposed rice husk fiery remains blended cement.

II. METHODOLOGY



III. RESULTS AND DISCUSSION

Initial test were conducted on cement, sand, coarse aggregate. The results are given below.

A. Rice husk ash:

Specific gravity of RHA =2.1

Bulk density of RHA = 300 to 400kg/ m³

Dry density of RHA = 407kg/m³

Fineness of RHA = 25%

B. Fine aggregate:

Specific gravity = 2.59

Fineness of fine aggregate = 99.3%

C. Coarse aggregate:

Fineness modulus = 99.25%

Specific gravity = 2.3

D. Cement:

Specific gravity = 3.1

Initial setting time = 30 minutes

Final setting time = 600minutes

E. Mix Design

- Target strength - 20Mpa
- Max size of aggregate used - 20mm
- Specific gravity of cement - 2.608
- Specific gravity of sand - 2.59
- Specific gravity of coarse aggregate - 2.3

F. Design Procedure

Calculation of cement, sand, aggregate and ash for one cube.

- Grade of concrete = M20 grade
- Mix ratio of concrete = 1: 1.5: 3 = 5.5
- Density = mass / volume
- Density of concrete = 24KN/ m3
- Volume of cube = 150mm *150mm* 150mm = 2400 * 0.15³
- Mass = 8.1kg

1*8.1 / 5.5: 1.5 * 8.1 /5.5: 3*8.1 / 5.5 Amount of cement adding for one cube = 1.5kg Amount of fine aggregate adding for one cube = 2.20kg

Amount of coarse aggregate adding for one cube = 4.42kg

10% of ash will be added 10 /100 *1.5 =1.35kg of cement & 0.15kg ash

Calculation of water content:

W /C = 0.45

Water content = 0.45 * 1.5

= 0.675litrs.

G. Concrete mix ratio: (FOR ONE CUBE)

MIX	Cement (kg)	RHA(kg)	Water (L)	Fine aggregate (kg)	Coarse aggregate (kg)	W / Cement ratio
CM	1.5	0	0.675	2.2	4.42	0.45
10% RHA	1.35	0.15	0.675	2.2	4.42	0.45
20% RHA	1.2	0.3	0.675	2.2	4.42	0.45
30% RHA	1.05	0.45	0.675	2.2	4.42	0.45
40% RHA	0.9	0.6	0.675	2.2	4.42	0.45

H. Test On Concrete With Rice Husk Ash :

Slump Test:

- Bottom diameter : 20cm
- Top diameter : 10cm
- Height : 30cm

Rice husk ash %	Compressive strength of concrete cube N/mm ² 7 days	Compressive strength of concrete cube N / mm ² 14 days	Compressive strength of concrete cube N /mm ² 28 days
0	13.33	23.2	26.12
10	19.33	26.22	30.66
20	18.22	21.11	23.11
30	14.02	16.88	20.3
40	8.8	9.3	8.8

I. Comparison Between Ordinary Concrete & With Rha Concrete

- Compare to conventional concrete the construction cost is less[9]-[11].
- Compare to conventional concrete adding RHA of concrete the strength will be increased.
- The addition of admixture is should not be adding on ordinary concrete.
- Small amount of cement is adding on the RHA of concrete.
- Water absorption is will be high on RHA of concrete.

J. COST ANALYSIS

Cost analysis for addition of 15% of waste dust in bags of cement.

Weight of cement in 1 bag = 50kg

Total wt of cement in 10 bags = 50kg * 10 = 500kg

Totally required cement in addition of 15% = 500 - 75kg
= 425kg

Cost of 1 bag cement = Rs 350/-

Cost for 10 bags of cement = Rs 3500/-

Cost for 425 kg of cement = Rs3050/-

Amount saved for 10 bags of cement = Rs 3500 – 3050
= Rs 450/-

So for every 10 bags of cement the addition of 15% of RHA saves Rs.45.

IV. CONCLUSION

There have been a few potential utilizations of rice husk powder in development industry. Be that as it may, likely because of absence of methodical investigations, enough information is as yet not accessible for its wide spread use in development. The expansion of the squanders improves the physical and mechanical properties. At the point when the squanders are utilized notwithstanding bond up to 15% can be utilized to give cement of higher physical and mechanical properties[12]-[13].

Because of high fineness of rice husk fiery remains, it demonstrated to be extremely viable in guaranteeing generally excellent cohesiveness of mortar and concrete. Test results show the up to 20 to 30% of rice husk powder in the bond solid gives the best outcomes.

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