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A Study on Use of Rice Husk Ash in Concrete

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Abstract

Cement is the cheapest constituent of concrete. Over 5% of worldwide CO2 production is official by cement production. Similarly, due to the order in the fine aggregate. In this work, every second source for fine aggregate as rice husk ash is used. A study on properties of concrete when fine aggregate is in some measurer placed by rice husk ash. Percentage replacement of Fine aggregate with Rice Husk Ash (RHA) is fine aggregate is replaced at 0%,5%,10%, and 15% in a mix of M25 grade of concrete. The strength such as compressive strength is found out at 7, 14, and 28 days. The strength is compared with concrete and the most favorable percentage of replacement of RHA is identified.

Keywords

Rice Husk Ash (RHA), compressive strength, cement, concrete

1. Introduction

These days disposing of agro-misuse are the major problem. Paddy fields generate approximately of 120 million tons of rice husk annually. The husk formed from the rice giving out is also burned or in populated as a trash in rice producing nations such as India. Husk of rise can be utilized as a source of energy if it is burned to ash at a high temperature. The ash collected can be used as a fantastic aggregate and grinded finely. RHA is a pozzolanic substance with a silica content of 85 percent [1]. Using Rice Husk Ash as a cementitious substitute reduces the environmental impact.

2. Objective

1. By replacing regular sand with RHA, the most precise percentage of RHA in concrete to be determined.

2. By half-done substitution of fine aggregate, pozzolanic material such as RHA to be used in concrete.

3. Compressive toughness to be discovered.

4. To provide cost-effective production material.

5. maintain the environment by utilize waste accurately.

3. Experimental Material USE OR Properties

3.1. Cement

Cement made from a substance capable of keeping strong matter particles together into a small study mass. Water-powered and non-pressure-driven machines are both used in the construction sector [2]. A 43 grades ordinary Portland cement (opc) were utilized.

3.2 Fine Aggregate

Sand with a capability to pass through the sieve size of 4.75mm is utilized and 2.63 is the specific gravity.

3.3 Coarse Aggregate

The optimum size for the coarse aggregate considered is 20 mm.

3.4 Normal Water

For the purpose of casting and curing, the potable water is utilized.

3.5 Rice Husk Ash

RHA was roasted for about 60 hours in the air using an unrestricted on-fire method. The heat generated was between 400 and 600 degrees Celsius. The ash was collected as a fine material, which was then sieved via an IS sieve.

4. METHODOLOGY

Firstly, to examine all the raw materials that are cement (OPC grade43) and sand to ensure that the quality of material which is to be used is good and acceptable. After testing of raw materials, cubes of dimensions 150mmx150mmx150mm will be casted. For each mix 12 cubes will be casted which will be then cured and tested at 28, 14 and 7 days for determining compressive toughness [3]. After all test calculations are compiled and noted, the results will be analyzed for the best performing mix. Then, all the cost-based calculations will be carried out with respect to that mix.

- (0%replacement ,5%replacement, 10% replacement and 15% replacement).
- Testing of raw materials to ensure good quality of materials.
- compressive strength test.
- Performing compressive test on each mix and analyzing their results.

The mixture was created for M25 grade as per the rule IS: 456 at the ratio of 1:1:2 percentage replacement and mix design proportion for 1m3 of concrete for 25 N/mm2 strength of ratio 1:1:2

5. OBSERVATION

- Calculated with respect to cement of grade 43
- 12 cubes casted for testing at 7, 14, 28 days.

- Cube of 150 mm is used.

Table 1. Mix Ratio Proportions

Batch no.	Replacement of Fine Aggregate
1	0%
2	5%
3	10 %
4	15%

Table 2. Mix Ratio Proportions

Batch no.	Cement (kg)	RHA (kg/gm)	Fine Aggregate	Corse Aggregate	W/c (L)
1	5.644	0%	6.180	11.775	0.4/2.25
2	5.644	5%	5.966	11.775	0.4/2.32
3	5.644	10%	5.652	11.775	0.4/2.52
4	5.644	15%	5.338	11.775	0.4/3.50

6. CONCLUSION AND RESULTS:

Rice husk ash's pozzolanic activity is effective not only in restoring concrete toughness, but also in civilising the concrete‘s impermeability. Furthermore, the use of rice husk ash in concrete reduces the weight of concrete. The building and rice sectors may discourage the use of rice husk ash in concrete. Compressive toughness examinations be performed at the age of 7, 14, and 28 days. A comparative research was conducted on control concrete with RHA replacing fine aggregate in percentages of 0%, 5%, 10%, and 15%.

Batch no.	Compressive strength (N/mm2)	Compressive strength (N/mm2)
	7days	28 Days
1	15.2	26.7
2	14.6	24.6
3	14.8	23.8
4	16.7	27.1

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