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Study on effect of rice husk ash (pozzolanic and green supplementary material) on concrete

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ABSTRACT

Rice Husk Ash (RHA) is a highly reactive Pozzolanic material that can be used for replacement of cement at various percentages. The Rice milling industry generates a huge amount of rice husk during milling of paddy which comes from the agricultural field. This rice husk can be used as supplementary cementing material with Ordinary Portland cement. The main aim of this review paper is to show the modified properties of concrete made from the addition of RHA in different percentages. The effects of RHA on concrete properties such that compressive strength, workability, tensile strength shall be investigated.

Keywords— *Rice husk ash, Compressive strength, Workability of concrete*

1. INTRODUCTION

The need to reduce the high worth of ordinary Portland cement in concrete has intense analysis into the use of some domestically obtainable materials that might be used as a partial replacement for normal Portland Cement (OPC). From the middle of the twentieth century, there had been a rise within the consumption of mineral admixtures by the cement and concrete industries. Substantial energy and price savings may result once industrial by-products are used as a partial replacement for the energy-intensive Portland cement. Rice milling generates a by-product referred to as a husk. Concrete may be a widely used construction material for numerous kinds of structures because of its structural stability and strength.

Rice husk is an agricultural waste that's made throughout the rice milling method. RHA is one in every of the promising pozzolanic materials which may be utilized in the lime-pozzolan mixture and as a replacement material of hydraulic cement. The technological trend towards waste utilization and the price reduction in the industrial process has attracted the utilization of Rice Husk as a worth supplementary material. Each rice husk (RH) and Rice Husk Ash (RHA) is found appropriate for a large range of domestic moreover as industrial applications RHA that has amorphous silica content and huge expanse is produced by combustion of rice husk at a controlled temperature. Physical characteristics and chemical composition of mineral admixtures are fulfilled by burning Rice husk into ash.

2. METHODOLOGY

2.1 Materials

The binders used in the experimental work shall be Ordinary Portland Cement OPC 43 grade conforming to IS8112:1989 and Rice Husk Ash (RHA). Rice Husk ash shall be obtained by burning rice husk at a controlled temperature of 700oC for 3 hours. Then rice husk ash shall be sieved through Indian standard sieve size 75µm.

Naturally occurring clean sand, free from impurities, shall be used as the fine aggregates. Sieve analysis shall be conducted in accordance with IS 383 (1970) on the fine aggregates to determine its grade zone for mix design purpose. Similarly, the 20 mm and10 mm coarse aggregates sieve analysis test shall be conducted accordance to IS 383 (1970). Samples of aggregates for each batch of concrete shall be of the desired grading and shall be in an air-dried condition.

2.2 Method

The Normal concrete shall be produced based on a mix of 1:1:2 for cement, sand and coarse aggregate respectively. The cement shall be partially replaced by combinations of Rice Husk Ash in different proportion. For compressive strength test, cube specimens of dimensions 150 x 150 x 150 mm shall be prepared and filled Rice Husk Ash with M25 grade concrete in different proportions. The cube shall be removed from the moulds at the end of 24 hours and immersed in clean water till the 7 or 28-days age of testing As per IS: 516 1959. Shall be shown the effects of RHA on concrete properties.

3. LITERATURE REVIEW

P. Padma Rao and A. Pradhan Kumar contemplated the Use of Rice Husk Ash in Concrete, In this examination, an achievability think about is made to utilize Rice Husk Ash as an admixture to an as of now supplanted Cement with fly fiery remains (Portland Pozzolana Cement) in Concrete, and an endeavour has been made to research the quality parameters of cement. Five diverse substitution levels in particular 5%, 7.5%, 10%, 12.5% and 15% are decided for the investigation worry to

substitution strategy. The huge scope of curing periods beginning from 3days, 7days, 56days are considered in this examination. All materials could be sent to temperature, ideally 270+ 30 C before beginning the outcomes. At all the concrete substitution levels of Rice husk fiery remains; there is a steady increment in compressive quality from 3 days to 7 days. However, there's a noteworthy increment in compressive quality from 7 days to 28 days took when by a slow increment from 28 days to 56 days.

Shaswat Kumar Das: Examined that RHA can be used as a partial replacement of cement in OPC concrete and as source material in Geopolymer concrete. Silica fume is also being used as a mineral admixture in India for making special concrete mixes but due to its high cost, therefore, RHA will be a perfect substitute as it possesses similar properties to that of silica fume. RHA is rich in silica so it's a pozzolanic material and can be used as source material in Geopolymer concrete in addition to another source.

Mehta, P. K., RHA contains silica. Thus the utilization of RHA with concrete enhances workability and solidness, decreases heat development, heat breaking and plastic shrinkage.

Makarand Suresh Kulkarni examined the effect of rice husk ash on properties of concrete The fundamental target of this work is to ponder the reasonableness of the rice husk fiery debris as a Pozzolanic material for bond substitution in concrete. Yet it's traditional that the employment of rice husk fiery debris in concrete enhances the standard properties of cement. Additionally, it is an endeavour made to build up the solid utilizing rice husk cinder as source material for halfway substitution of the bond, which fulfils the different basic properties of solid like compressive quality and Flexural quality. From the complete trial work and studies, it's likely that blend M2 (M0+20% RHA) is that the best combination among all blends, which supplies max, tractable, flexure and pressure quality over typical cement.

Ghassan Abode Habeeb et al., (2010 detailed that the compressive quality of the mixed cement with 100% RHA has been expanded altogether, and for up to 20 substitutions may well be extremely supplanted by concrete while not unfavourably influencing the standard. increasing RHA fineness upgrades the standard of mixed concrete.

4. CONCLUSIONS

Based on the research conducted, the conclusion could be drawn that the workability of concrete increases with an increase in the addition to RHA. And it can be used as an admixture in concrete. The use of RHA will help in reducing the CO2 emission and also reduce the problem of disposal of this agro-waste. The RHA can be used to produce ultra-high strength and ultra-high performance concrete.

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