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Replacement of Cement in Concrete with Rice Husk Ash

Arvind Kumar^{#1}, Amit Kumar Tomar^{#2}, Shrvan Kishor Gupta^{#3}, Ankit Kumar^{*4}

[#] M.Tech. Student, Deptt. of Civil Engineering, Roorkee Institute of technology, Roorkee -247667, U.K, India

^{*} Assistant professor, Deptt. of Civil Engineering, Teerthankar Mahaveer University, Moradabad – 244001, U.P., India

Abstract — In India rice milling produces a by product which is known as Husk. This husk is used as fuel in rice mills to produced steam for boiling process .This husk contain near about 75 % organic matter and the remaining 25% of this husk is modified into Ash during the firing process which known as rice husk ash (RHA). The rice husk ash (RHA) contain near about 85 % to 90 % amorphous silica. By using rice husk ash in concrete, we can improve the properties of concrete. The current study and experimental investigation were taken to study the properties of concrete made with Rice husk ash . the replacement is done partially in the proportion of 0% ,20% and its effect on workability of concrete made with rice husk ash were investigated for the 20% rice husk ash replacement ,the hardened properties such as compressive strength observed were good as compare to 0 % RHA . The compressive strength test was conducted at 0 % and 20 % rice husk ash replacement and the highest compressive strength at 20 % RHA replacement as compared to 0% RHA replacement at 14 ,21 and 28 days.

Keywords — Rice husk ash, compressive strength etc.

I. INTRODUCTION

Rice husk may be a rural deposit that represents 20% of the 649.7 million a lot of rice created each year round the world. The delivered somewhat blazed husk from the process plants once used as a fuel likewise adds to contamination and endeavors are being created to defeat this natural issue by using this material as a supplementary establishing material². The artificial arrangement of rice husk is found to vary beginning with one specimen then onto successive attributable to the distinctions within the reasonably paddy, harvest year, atmosphere and geologic conditions.

Smoldering the husk beneath controlled temperature beneath 800 °C will deliver fiery remains with silica primarily in shapeless structure. As of late, Nair et al. reportable an examination on the pozzolanic movement of RHA by utilizing completely different systems as an area of request to examine the impact of combustion temperature and smoldering length. He expressed that the specimens blazed at 500 or 700 °C and smoldered for over 12 hours delivered fiery junk

with high reactivity with no noteworthy measure of crystalline material. The short blazing spans (15 - 360 minutes) caused high carbon content for the created RHA even with high burning temperatures of 500 to 700 °C. A best in class report on rice husk fiery debris (RHA) was distributed by Mehta in 1992, and contains a survey of physical and compound properties of RHA, the impact of combustion conditions on the pozzolanic qualities of the clinker, and a rundown of the exploration discoveries from a number of nations on the use of RHA as a supplementary establishing pozzolanic material.

What is RHA

Rice husk may be smoldered into fiery remains that satisfies the physical qualities and compound piece of mineral admixtures. Pozzolanic action of rice husk cinder (RHA) depends on upon (i) silica content, (ii) silica crystallization stage, and (iii) size and surface region of fiery remains particles. Likewise, cinder should contain simply a little measure of carbon. The upgraded RHA, by controlled blaze and/or pounding, has been used as a pozzolanic material as a part of bond and cement. Utilizing it provides a number of focal points, as an example, increased quality and toughness properties, and natural benefits known with the transfer of waste materials and to lessened carbon dioxide emanations.

RHA created within the wake of smoldering of Rice husks (RH) has high reactivity and pozzolanic property. Concoction structures of RHA are influenced because of blazing procedure and temperature. silica contents within the powder increments with higher the blazing temperature. The impact of halfway supplanting of bond with various rates of ground RHA on the compressive quality and sturdiness of cement is analyzed.

II. MATERIALS AND METHODS

Materials:

RHA: Rice Husk Ash was blazed for roughly 72hours in air in an uncontrolled burning method. The temperature was within the scope of 400-600 degree C .The powder collected was sieved through bs standard sieve size 75µm and its shading was dim.

Cement: Ordinary Portland concrete (OPC) of 43 evaluation was utilized as a section of that the structure and properties is in consistence with the

Indian standard association. Concrete will be defined as the holding material having strong and glue properties that create it capable to join the various development materials and structure the compacted get together. Standard/Normal Portland concrete is a standout amongst the most broadly utilised kind of Portland cement. The name Portland bond was given by Joseph Aspdin in 1824 due to its similarity in shading and its Quality when it solidifies like Portland stone. Portland stone is white dim limestone in island of Portland, Dorset.

Aggregate: Total is a granular material, as an example, sand, rock, squashed stone, smashed hydraulic-bond cement, or iron impact heater slag, utilized with water powered establishing medium to make either concrete or mortar. Those particles that are dominatingly which held on the 4.75 mm (No. 4) strainer are known as coarse total. Those particles passing the 9.5 mm (3/8 in.) strainer, all passing the 4.75 mm (No. 4) strainer, and transcendently held on the 75 µm (No. 200) sieve are known as fine total.

Methodology:

It is in addition expected that the last results of the venture can have a general helpful impact on the utility of rice husk powder concrete within the field of structural building development work. Taking when parameters impacts conduct of the rice husk fiery debris solid, thus these parameters are kept consistent for the exploratory work.

1. Percentage substitution of concrete by rice husk powder Fineness of rice husk ash
2. Chemical structure of rice husk fiery debris 1
3. Water to cement material ratio (w/c ratio)
4. type of curing

Additionally from the writing study, it's watched that the parameters suggested by varied analysts and their outcomes aren't coordinative with one another. it absolutely was due to variety in properties of various materials thought of within the work. along these lines the rate substitution of bond by rice husk slag and strategy for blend outline is settled once preparative examination

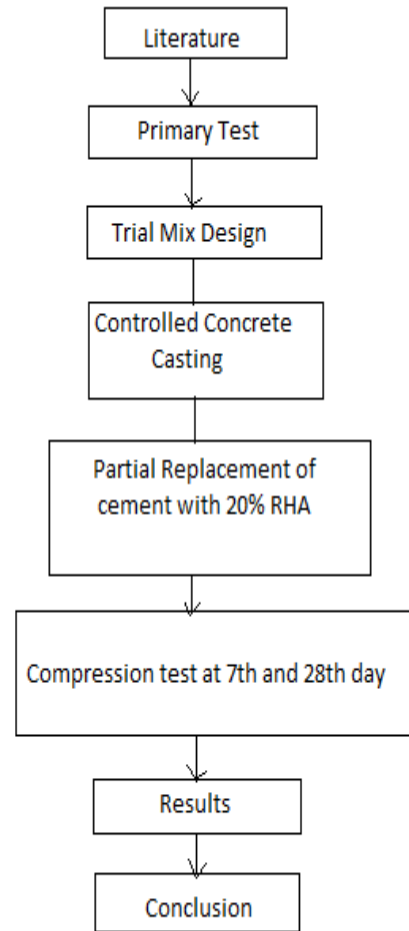


Fig-1 Flow chart depicting the methodology

III. RESULTS

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Table 1. Compressive strength at different curing days

DAYS	Compressive Strength (n/mm ²)	
	(0% R.H.A)	(20% R.H.A)
7	22.38	20.27
14	27.52	28.34
21	32.45	33.67
28	36.5	37.6

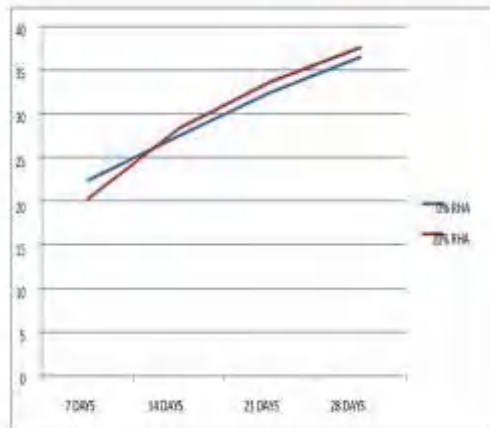


Fig-2: Graph Shows Variation In Compression Strength

IV. CONCLUSION

In view of the restricted study did on the quality conduct of Rice Husk cinder, the accompanying conclusions are drawn.

1. At all the bond substitution levels of Rice husk fiery debris; there is slow increment in compressive quality from 3 days to 7 days. However there is huge expansion in compressive quality from 7 days to 28 days took after by slow increment from 28 days.
2. By utilizing this Rice husk fiery debris as a part of concrete as substitution the discharge of nursery gasses can be diminished to be a more noteworthy degree. Therefore there is more prominent plausibility to acquire number of carbon credits.
3. The specialized and monetary focal points of fusing Rice Husk Ash in cement ought to be misused by the development and rice commercial enterprises, all the more so for the rice developing countries of Asia.
4. RHA based sand concrete piece can essentially decrease room temperature. Henceforth ventilation system operation is diminishing bringing about electric vitality sparing.
5. Also with the utilization of rice husk powder, the heaviness of cement lessens, along these lines making the solid lighter which can be utilized as light weight development material.
6. To The pozzolonic action of rice husk fiery remains is viable in upgrade the solid quality, as well as in enhancing the impermeability attributes of cement
7. As the Rice Husk Ash is waste material, it lessens the expense of development.

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