Concrete with Rice Husk Ash as a Partial Replacement of Cement

DINESH KUMAR [1]

[1] *Dept. of Civil Engineering, Shekhawati institute of engineering and Technology, Sikar*

Abstract -- In India rice milling produces a by product which is known as Husk. This paper summarizes the feasibleness of mistreatment partial rice husk ash on the cement so as to mitigate the provision, affordability, quality and pollution problems. This husk is employed as fuel in rice mills to created steam for boiling method. This husk contain close to concerning seventy five nothing organic matter and therefore the remaining twenty fifth of this husk is modified into Ash throughout the firing method that referred to as rice husk ash (RHA). The rice husk ash (RHA) contain close to concerning eighty five you must ninety nothing amorphous silicon oxide. By mistreatment rice husk ash in concrete, we are able to improve the properties of concrete. this study and experimental investigation were taken to review the properties of concrete created with Rice husk ash . the replacement is completed partly within the proportion of third ,20% and its impact on workability of concrete created with rice husk ash were investigated for the two hundredth rice husk ash replacement ,the hardened properties like compressive strength determined were smart as compare to zero nothing RHA . The compressive strength check was conducted at zero attempt to twenty rice husk ash replacement and therefore the highest compressive strength at twenty nothing RHA replacement as compared to third RHA replacement at fourteen ,21 and twenty eight days.

I. INTRODUCTION

The Rice husk (RH) is that the agricultural residue that is obtained from the covering of rice grains throughout the edge method. producing of rice within the world is quite 700 million tones. Rice husk includes 75-90% organic matter like polymer, cellulose, etc. and rest inorganic elements like alkalis, silicon oxide and trace parts. The advancement of concrete technology will scale back the consumption of natural resources and energy sources and fewer the burden of pollutants on atmosphere. In recent years, several researchers have established that the employment of supplementary building material materials (SCMs) like ash (FA), furnace scum, silicon oxide fume, met kaolin (MK), and rice husk ash (RHA), hypo sludge etc. which can, not solely improve the varied properties of concrete - each in its recent and hardened states, however can also contribute to economy in construction prices.

Concrete is that the most typical construction material within the world as a result of it combines superb mechanical and sturdiness properties, workability and relative low value. However, cement production emits greenhouse gases, mainly CO2, being accountable for concerning five-hitter of world evolution greenhouse gas emissions within the world. Since one metric weight unit of cement produces some one metric weight unit of greenhouse gas, the employment of low emission pozzolans as cement replacement is one among the probabilities to scale back greenhouse gases emissions.

Thus the concrete business offers a perfect technique to integrate and utilize variety of waste materials, that square measure socially acceptable, simply out there, and economically at intervals the shopping for powers of a standard man. Presence of such materials in cement concrete not solely reduces the greenhouse gas emission, however conjointly imparts vital improvement in workability and sturdiness. within the gift investigation, a feasibleness study is created to use Rice Husk Ash as Associate in Nursing admixture to already replaced Cement with ash (Portland Pozzolans Cement) in Concrete. The main objective of this analysis work is to keep up property by the employment of rice husk ash as partial replacement of cement that has strength and sturdiness to concrete. The employment of RHA was third, 5%, 100% and V-J Day. This analysis can discover the role of RHA as cement replacement within the concrete below totally different solidification conditions together with water, vitriol and acid.

- Objectives:
- Effect of Rice Husk Ash on workability.
- Effect on Compressive strength of concrete.
- Effect on flexural strength of concrete.
- Effect on split tensile strength of concrete.
- Comparison of Results of different tests with varying proportion of RHA.

II. METHODOLOGY AND WORK PLAN

The main objective of this work is to study the suitability of the rice husk ash as a pozzolanic material for cement replacement in concrete. However it is expected that the use of rice husk ash in concrete improve the strength properties of concrete. Also it is an attempt made to develop the concrete using rice husk ash as a source material for partial replacement of cement, which satisfies the various structural properties of concrete like compressive strength and Flexural strength.

It is also expected that the final outcome of the project will have an overall beneficial effect on the utility of rice husk ash concrete in the field of civil engineering construction work.

III. MATERIALS

1. Cement:

Ordinary Portland cement Grade 43.Cement is the fine grey powder that acts as binding materials which is used for the construction. The cement that was used during experiment was Ordinary Portland Cement 43 grade confirming to IS 8112 impurities were removed before the process.

2. Rice Husk Ash:

This research is aimed at replacement of cement with Rice Hush Ash (RHA), a local additive which has been investigated to be super pozzolanic in a good proportion to reduce the high cost of structural concrete. Rice Husk Ash (RHA) is an agricultural waste product, and how to dispose of it is a problem to waste mangers. RHA from the parboiling plants is posing serious environmental threat and ways are being thought of to dispose them. This material is actually a super Pozzolanic since it is rich in Silica and has about 85% to 90% Silica content.

3. Aggregates:

The aggregates used from locally available sites

- Fine aggregates:

The sand that was used for the research work was obtained locally that fulfills the requirement provided by Indian Standard 383 1970.The purity of the sand was analyzed glancing the code provided by Indian Standard. Fine aggregates having specific gravity-2.67, fineness modulus-2.67 and water absorption-0.6% were used during whole research work.

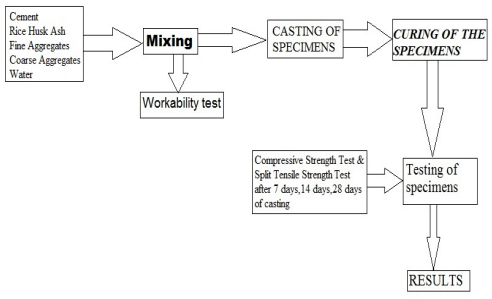
- Coarse Aggregates:

The aggregates that are used for this research work are taken from the locally available natural rocks that are getting retained on 4.75micron sieve after being crushed. These granite passes the requirement provided by Indian Standard 383 1970.having specific gravity-2.84, finenessmodulus-7.94, water absorption-0.6% and aggregate impact value-11.74%.

4. Water:

The water that is used for the research work was obtained locally that fulfill the requirement provided by Indian Standard. The water was clean and free from any visible impurities. Water is being supplied partially deliberating the proportionate ratio Potable water, clean and without having any visible impurities.

IV. METHODOLOGY



V. RESULTS

Two types of tests were performed; first one on fresh concrete and other was on hardened concrete. On fresh concrete slump cone test was performed. For finding the properties of hardened concrete simple compression test was performed. In other words, it involved the determination of workability and compressive strength of the concrete at different level of replacement. Compressive strength at different curing days.

VI. SLUMP TEST

Test performed just after mixing was slump test to find the workability of concrete. It was performed in accordance to Indian standard. The following table showing the values of controlled and different incorporation of RHA.

VII. COMPRESSIVE STRENGTH TEST

Compressive strength is usually considered as one of the most important properties of concrete and a major indicator of general quality control. Factors influencing the strength of concrete include the types and quality of materials, the mixture proportion, the construction methods, the curing condition, and the test method. From the microscopic point of view, both the degree of hydration and the porosity play important roles. The greater the volume of the pores, the lower the strength of the concrete will be. Result of compressive strength is given in table below.

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	Compressive Strength (n/mm2)	
DAYS	(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

VIII. CONCLUSIONS

- The workability of rice husk ash reduced with increase in share of rice husk ash. The compaction issue has been reduced with increase in share of rice husk ash.
- The compressive strength of the concrete with partial replacement of rice husk ash will increase with increase the proportion of rice husk ash at some extent.

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