iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 4 **Issue:** V **Month of publication:** May 2016

DOI:

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Volume 4 Issue V, May 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

A Review of Development of Mechanical Properties of Self Compacting Concrete Contain Rice Husk Ash

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Abstract - The scope of this research was to determine the usefulness of Rice husk ash (RHA) in the development of economical self compacting concrete (SCC). The cost of materials will be decreased by reducing the cement content by using waste material like rice husk ash instead paper presents a study on the development of Mechanical properties up to 60 days of self compacting and ordinary concretes with rice-husk ash (RHA), from a rice paddy milling industry (Rajapalayam). Two different replacement percentages of cement by RHA, 10%, and 20%, and water/cementicious material ratios (0.40 & 0.45), were used for both of self compacting and normal concrete specimens. The 7day 28day and 60day results are compared with those of the self compacting concrete without RHA, with compressive, flexural strength.
Keywords – Self compacting, concrete, rice husk ash, Compressive strength, Flexural Strength

I. INTRODUCTION

Self-compacting concrete (SCC) is defined as the concrete which can be placed and compacted into every corner of formwork, purely by means of its self-weight, by eliminating the need of either external energy input from vibrators or any type of compacting effort. High flow ability requirement of SCC allows the use of mineral admixtures in its manufacturing, use of mineral admixtures results in reduction in the cost of concrete. The incorporation of one or more mineral admixtures/powdery materials having different morphology and grain size distribution can improve particle-packing density and reduce inter-particle friction and viscosity. Hence it improves deformability, Self- compactibility and stability of SCC.

II. LITERATURE REVIEW

B.H.V. Pai M. Nandy Investigated on SCC mixes containing Rise husk ash , and that containing rice husk ash as filler materials were tested for their fresh properties as per EFNARC guidelines. Both SCC mixes have satisfied all the acceptance criteria laid down by EFNARC. The hardened properties like compressive strength, split tensile strength and flexural strength were checked and found that not all the test results were satisfactory. Also, the optimum level of cement replacement with Rise husk ash ash for normal concrete is 35% The low strength of Rise husk ash based SCC is possibly due to the high amount of Rise husk ash (60.11% of total powder). It is also observed from the results that the calculated cement content (200kg/m3) as per the Nan Su et al. Method was not adequate to give the required strength to the mix. The quantity of cement content calculated was possibly not sufficient to bind all the ingredients in the mix.

Snehal Afiniwala Investigated on in partial replacement of OPC with class F Rise husk ash does not affect the properties of fresh concrete to perform as Self Compacting Concrete. All the parameters for flowing, passing abilities are within limit specified in ENAARC standards. Use of Rise husk ash adds to the cohesiveness of mix, workability, reduction in bleeding and segregation and ultimately durability. Use of Rise husk ash addresses the issue of environmental and economical aspect and hence sustainability of concrete technology at large.

MR U. N. Shah and DR C. D. Modhera Investigated on SCC mixes are prepaid for different amount of Rise husk ash as a cement replacement, ranging from 30 to 70 percentages. During the study reduction in compressive strength observed as the Rise husk ash percentage got increase. It is observed that the split tensile strength of SCC got reduced as the flyash percentage increased.

Mounir M. Kamal et al Investigated on self compacting concrete the addition of either steel or polypropylene was noticed to enhance the fresh properties of self-compacted concrete by reducing the bleeding. While the control mix test specimens failed suddenly in flexure and impact, the counterpart specimens contain fibers failed in a ductile manner, and failure was accompanied by

several cracks.

K. M. A. Hossain et al Investigated on development of selfconsolidating concrete (SCC) using volcanic ash (VA). Mix proportions, fresh and hardened properties as well as durability characteristics of twelve VA SCC mixtures demonstrate that VA can be used to develop SCC with acceptable properties. It is possible to produce SCC by using 20 to 50% VA as cement replacement. However, the replacement level of Portland cement by VA should be selected carefully in combination with water to binder ratio to achieve desired compressive strength, setting times and durability.

Sumrerngrukzon and Prinyachinda Prasirt Investigated on self compacting concrete containing fine irregular-shaped particles increases the amount of sp required. The use of the blend of pozzolans of fine ghrba also effectively improves the Scc in terms of corrosion and resistance to chloride penetration. The results indicate that the incorporation of 30% of Grhba decreases the corrosion, chloride penetration of self compacting concrete.

Deepa Balakrishnan S & Paulose K.C. This investigation, it has been observed that the use of Rise husk ash in SCC mixes reduces the possibility of bleeding and segregation, and increases the filling and passing ability of concrete, whereas dolomite powder imparts viscosity to the concrete and improves the segregation resistance of the concrete mix. The major findings of the study are better mechanical and physical properties of concrete can be obtained with the replacement of cement with Rise husk ash from 12.5 percent to 18.75 percent. Further it has been observed that SCC could be prepared using dolomite powder instead of VMA. The use of dolomite powder in self compacting concrete mixes reduces the possibility of segregation. Better fresh properties of SCC can be obtained with the replacement of cement with dolomite powder from 6.25 percent to 12.5 percent. The best self compacting properties were obtained by replacing the cement with the Rise husk ash in 37.5 percent and fine aggregate content to 55 percent of the total aggregate, using a 53 grade ordinary Portland cement and the water powder ratio remained as 0.33. From this experimental study it can be inferred that Rise husk ash and dolomite powder blend well to improve the overall workability, which is the prime characteristics of SCC. The present study promotes the use of Rise husk as , which is otherwise considered as waste material. Hence the Rise husk ash – dolomite based SCC is a sustainable material for future construction works. However, design methodologies are to be developed for this concrete prior to actual use in worksite.

Vageesh H.P & reena K. Investigated on SCC with 10% Rise husk ash replacement has same Compressive strength and as good as Normal SCC without Rise husk ash . At 14 days the strength is much higher than Normal strength concrete. 10% replaced SCC has much higher Tensile strength than 20% and 30% replaced specimens. 10% replaced SCC has Tensile strength lower than Normal SCC by about 17.75% (ft = 0.81ft-NSCC) SCC with 10% replacement gains about 80% of the strength than compared to Normal SCC under Tensile loading. In Flexure SCC with 10% replacement has higher strength compared to 20% and 30% replaced specimens. SCC with 10% replacement is about 11% lower in Flexure strength than Normal SCC. (ff = 0.89fck-NSCC) It is understood that Flyash can be replaced in SCC upto 10% to obtain a reasonable good mix as that of SCC without Rise husk ash .

U. N. Shah & C. D. Modhera Investigated on SCC Slump flow increases as the percentage of Rise husk ash replacement increases in the mix and slump spread is increasing from 730 to 780 as Rise husk ash increases from 30 percentage to 70 percentage . L box ratio is increases as the Rise husk ash is increases in the mix as a replacement of the cement. V funnel passing time get reduce as the Rise husk ash percentage increases from 30 to 70 percentage. Addition of Rise husk ash increases the workability of the concrete, which enable us to reduce the water to binder ratio for the same workability.

Dhiyaneshwaran et al, Investigated on SCC mixes containing Rise husk ash , and that containing rice husk ash as filler materials were tested for their fresh properties as per EFNARC guidelines. Both SCC mixes have satisfied all the acceptance criteria laid down by EFNARC. The hardened properties like compressive strength, split tensile strength and flexural strength were checked and found that not all the test results were satisfactory. Also, the optimum level of cement replacement with Rise husk ash ash for normal concrete is 35% The low strength of Rise husk ash based SCC is possibly due to the high amount of Rise husk ash (60.11% of total powder)

J.M. srishaila1 et al Investigated on SCC were performed to determine the fresh properties and to evaluate the relationship between mechanical properties of Self Compacting Concrete mixtures and the results of the tests are as follows Workability of the mix increases as the percentage of silica fume decreases. The mix with 6% silica fume as replacement of cement gives better workability when compared to mixes with 9% and 12 % silica fume replacement of cement.

III. CONCLUSIONS

Based on the investigation conducted for the study of behavior of self compacting concrete the following conclusions are arrived.

A. As no specific mix design procedures for SCC are available mix design can be done with conventional BIS method and suitable

adjustments can be done as per the guidelines provided by different agencies.

B. Trail mixes have to be made for maintaining flow ability, self compatibility and obstruction clearance.

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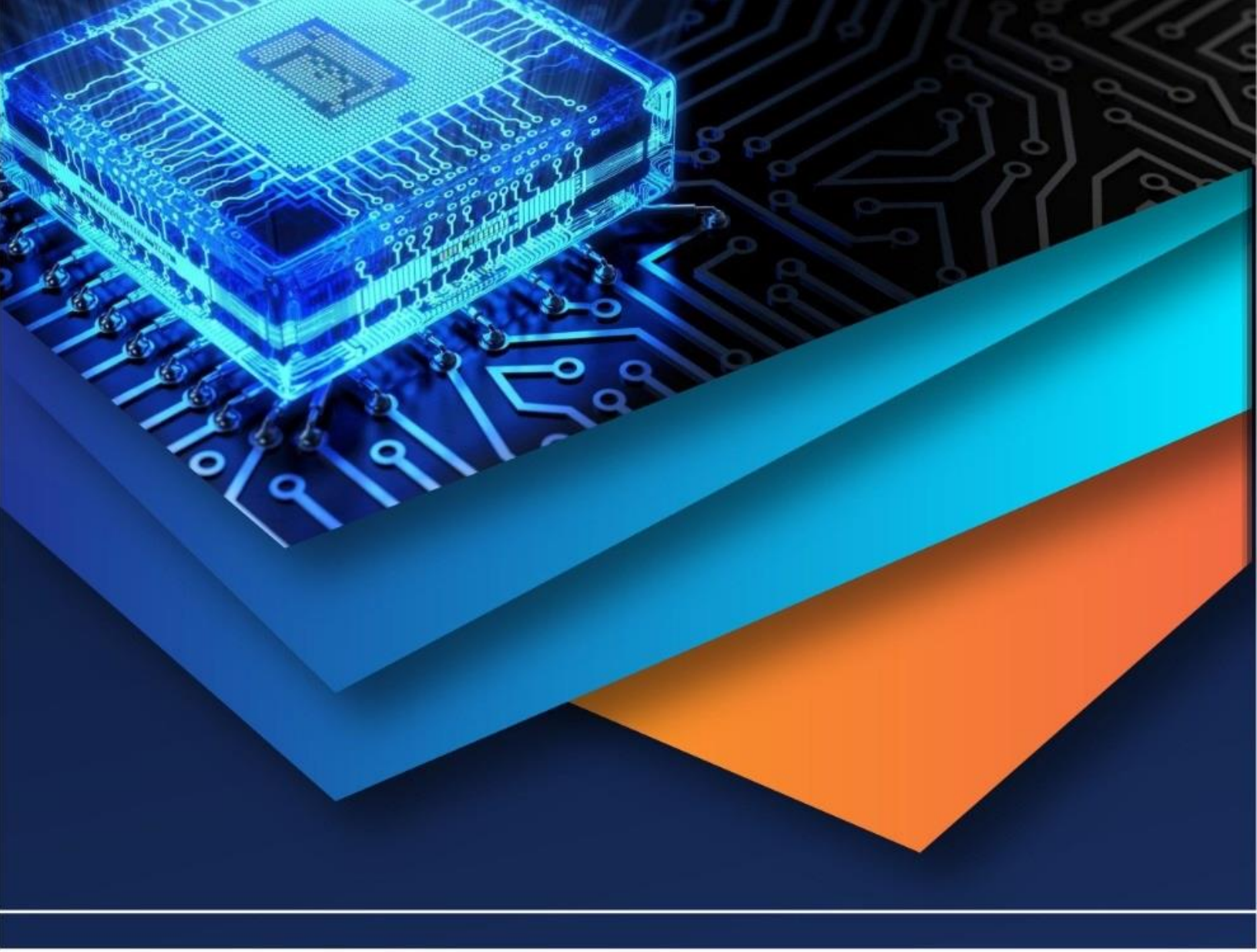

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