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A Review on Properties of Concrete using RHA and Polypropylene Fiber

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INTRODUCTION

The concrete having cement, sand and coarse aggregates mix up in an appropriate percentage in addition to water is called cement concrete. Concrete has better resistance in compression while steel has more resistance in tension. Conventional concrete has limited ductility, low impact and abrasion resistance and little resistance to cracking. A good concrete must possess high strength and low permeability. Hence, alternative Composite materials are gaining popularity because of ductility and strain hardening. To improve the post cracking behavior, short discontinuous and discrete fibers are added to the plain concrete.

WASTE PLASTIC POLYPROPYLENE FIBRE

Fibers are used in concrete to control crack due to plastic and drying shrinkage. They provides as impervious layer of concrete which controls permeability. Basically fibers do not increases flexural strength so it is not possible to replace for structural steel. The amount of fibers added to a concrete mix is expressed as a percentage of the total volume of the composite (concrete and fibers), typically ranges from 0.1 to 3%. In this study we used Waste Plastic Fiber derived from waste plastic pot possessing aspect ratio 20 and added as 1– 3% by weight in concrete composite.

Figure 1. Waste Plastic Polypropylene Fibre

RICE HUSK ASH (RHA)

Rice processing industry produces a great deal of rice husk during processing of paddy which comes from the fields. During processing of paddy around 22% of the heaviness of paddy is gotten as husk. This rice husk is generally utilized as a fuel in the boilers for handling of paddy. This husk contains around 75% natural unpredictable matter and the leftover 25% of the heaviness of this husk is changed over into debris during the terminating system, known as Rice Husk Ash (RHA).

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LITERATURE REVIEW

1. **Palanisamy Murthi, 2023** The results showed that PQC blended with WGP enhanced the strength slightly up to the replacement level of 15%. The addition of PP fibers rooted the reduction of the slump value; however, it improved the mechanical properties up to the presence of 0.5% PP fibers in PQC. The relationship between the compressive strength and flexural strength of WGP blended with PP fiber-reinforced PQC was established.
2. Bhupati **Kannur, 2023** This article presents the characteristics of low-fines self-consolidating concrete (LF-SCC) with rice husk ash (RHA) replacing cement (OPC) at 0 %, 10 %, 20 %, 30 %, 40 %, and 50 % by weight for the construction of rigid pavement. Results show that RHA up to replacement level 20 % positively improves properties of the LF-SCC, on further inclusion of RHA above 20 %, they decrease. All of the mixes' fresh properties comply with European standards. In application to pavement construction, all the

six LF-SCC mixes are satisfying the required limits of 20 for 7 days early strength, *30 MPa* to *40 MPa* for 28 days' compressive strength for rural and urban roads, respectively; and *3.8* to *4.5 MPa* for 28 days' flexural strength for rural and urban roads, respectively. The results of durability tests reveal that the mixes are less water absorbing, less permeable to water and other weathering agents. Thus, the mixes are well suitable for the construction of road pavements.

3. **Željko Kos**, **2022** The complex effect of the amount of cement, polypropylene fiber (the fiber length was 39 mm, and the diameter was 0.45 mm), and polycarboxylate superplasticizer on concrete properties for rigid pavement was determined using the methods of experiment planning and experimental-statistical modeling. The fluidity of all the mixtures was S1. The W/C of the mixtures depended on the composition of the concrete and variable from 0.32 to 0.46. It was found that, by increasing the amount of superplasticizer from 1% to 1.8-2%, the compressive strength of concrete increased by 4.5-6 MPa after 3 days and by 7-9 MPa after 28 days.

4. **AllanManalo, 2022** Waste administration is an area of critical worldwide concern. The reuse of waste materials, (for example, plastics, glass, wood, and so on) in substantial assembling has been read up for possible expense investment funds, upgrades in quality, and decrease of ecological effect prompting maintainability. This study analyzes the presentation of cement containing reused polyethylene terephthalate (PET) squander in granular structure to supplant the fine total. A progression of substantial examples for Grade 32 substantial blend were given involving PET granules a role as halfway substitution to fine totals in the combination (0%, 10%, 30%, and half substitution by volume of fine total). Significant properties like functionality (droop), thickness, compressive strength, versatile modulus, elasticity, flexural strength, and break mouth opening relocation (CMOD) were assessed along with the microstructural perceptions. The trial results demonstrated that volumetric supplanting of fine totals with 10% reused PET granules emphatically affected the qualities of the substantial. The discoveries further uncovered an improvement in the malleability of cement with reused PET granules content, but the impact was more articulated with the substantial containing 10% PET granules. The exploratory outcomes for the mechanical properties were thought about against accessible Australian and American plan rules and a solid straight relationship is noticed. Finally, the discoveries of this review on mechanical properties uncovered an ideal execution comparative with those announced in the accessible writing, especially for the substantial with 10% of fine total supplanted by PET granules.

5. **Anju Mary Ealias, 2021** Coconut shell and coir filaments are the normal materials which is bounteously accessible in tropical districts. Squanders produced by modern and horticultural cycles have made removal and the executives issues which present genuine difficulties to endeavors towards ecological preservation. A lot of coconut shells and filaments stay in the climate as waste, so use of these materials for development will be a significant stage to further develop supportability and eco-accommodating development. Notwithstanding that it will assist with delivering light weight and monetarily beneficial materials in development field. A review on the monetary angles was additionally done. The expansion of fly debris assists with expanding the strength and usefulness of cement. The outcomes acquired from above will be contrasted and customary cement of same blend. Catchphrases: coconut shell, coir filaments, compressive strength, electrical resistivity, fly debris, pH, parting elasticity, temperature resistivity, water assimilation.

6. **Sangeetha DM, 2019** Utilization of Fiber Reinforced Concrete (FRC) is one of the approaches to conquer the low elasticity of cement. Both natural and inorganic strands can be made use in the creation of FRC. Then again, the utilization of waste plastic is causing a genuine ecological contamination since the plastic don't weaken. Such waste plastic can be reused as filaments to deliver squander plastic FRC. Further, flyash, microsilica and redmud are another modern waste materials adding to ecological contamination. These waste materials are having cementatious properties and can be involved alongside squander plastic filaments in cement to lessen their hindering impact on mother earth. Hence in this paper an endeavor is made to evaluate the appropriateness of waste plastic FRC for development purposes when various rates of flyash, microsilica and redmud are presented. Different strength properties, for example, Compression, Tension, Flexure and Impact are concentrated alongside usefulness qualities. In light of the got results the modern squanders, for

example, flyash, microsilica, redmud and furthermore squander plastic filaments can be utilized in the creation squander plastic fiber built up substantial composite material.

7. **Josephin Alex, 2018** The emission of CO_2 has increased due to cement manufacturing and improper disposal of rice hush ash (RHA) leads to air pollution and land fill problem. To mitigate these issues, the RHA has been used as cement additive in concrete making. A Taguchi L_{27} fractional-factorial matrix was designed to assess the individual effects of key process variables like RHA loading, pozzolanicity, curing time, bulk density and RHA size. From the results, mechanical strength20 wt% RHA replacement is optimum increased with decreasing RHA size and for 15 and 60 min grounded sample. The morphology of RHA are also discussed.

OBJECTIVES

- To study the properties of concrete prepared by partial replacement of RHA and Polypropylene Fiber.

CONCLUSION

In above study, It can be concluded that higher strength and workability characteristics of Using partial replacement of RHA with cement coarse aggregate using Polypropylene Fiber. partial replacement of RHA with cement coarse aggregate using Polypropylene Fiber.

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