JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

STUDY ON STRENGTH OF PALM HUSK AND CORN HUSK IN FIBRE REINFORCED COMPOSITE CONCRETE

RAGURAMAN V*
Mohammed Suhail A, Harish R, Ranjith kumar S, Hari Haran K
*Assistant Professor, Civil Engineering, Sri shakthi institute of engineering and technology, coimbatore, India

ABSTRACT

Concrete is the most widely utilized "manmade" material globally for Construction in many developing countries in all types of civil engineering works. Also, concrete is an environmental - friendly material and in areas of growing environment — related awareness that is of prime importance. Many of investigations were attempted by the researchers to improve the quality, strength and durability against adverse exposures, since decades. Portland cement concrete is considered to be a relatively brittle material. When subjected to tensile stresses, unreinforced concrete will crack and fail. Since the mid 1800ts steel reinforcing has been used to overcome this problem. As a composite system, the reinforcing steel is assumed to carry all tensile loads. When fibers are added to the concrete mix, it too can add to the tensile loading capacity of the composite system. In fact, research has shown that the ultimate strength of concrete can be increased by adding fiber reinforcing. In this research paper, an attempt is made to use fibersonly .The experimental investigation consisting of casting and testing of compression tests were conducted on 150x150x150mm cube and 150mmx300mm, cylindrical specimens using test method that gave the complete compressive strength, split tensile test using with and without fiber. The strength durability and bond strength properties are carried out for various mix designations and compared with normal conventional concrete In present project work M25 grade considered and the Palm Husk fiber at 0.5, I l 1.5 ,2 and 2.5% volume fractions and Corn Husk fibers at l, I .5, 2,2.5 and 3% volume fractions are introduced into fiber-reinforced. Based on the results will find the superior crack resistance, improved tensile strength. The proposed sample will be tested at 7 days, 21 days and 28 days age Of curing. These results will show whether the FRC is suitable for proper confinement or not for structures subject to extreme load conditions.

I.INTRODUCTION

Concrete is weak in tension. Microcracks begin to generate in the matrix of a structural element at about 10 to 15% of the ultimate load, propagating into macrocracks at 25 to 30% of the ultimate load. Consequently, plain concrete members cannot be expected to sustain large transverse loading without the addition of continuous bar reinforcing elements in the tensile zone of supported members such as prisms or slabs. The developing microcracking and macrocracking, however, still cannot be arrested or slowed by the sole use of continuous reinforcement. The function of such reinforcement is to replace the function of the tensile zone of a section and assume the tension equilibrium force in the section. The addition of randomly spaced discontinuous fiber elements should aid in arresting the development or propagation of the microcracks that are known to generate at the early stages of loading history(24). Although fibers have been used to reinforce brittle materials such as concrete since time immemorial, newly developed fibers have been used extensively worldwide in the past three decades. Different types are commercially available, such as steel, glass, polypropylene, or graphite. They have proven that they can improve the mechanical properties of the concrete, both as a structure and a material, not as a replacement for continuous-bar reinforcement when it is needed but in addition to it

1.1 PROJECT AIMS AND OBJECTIVES

The objective of this study is to find out the Strength and durability properties of Palm Husk and Corn Husk fiber reinforced concrete composite. However, it is expected that the use of fiber in concrete improve the strength properties of concrete.

1.Effect of fibre on workability.

2.Effect on Compressive strength of concrete.

3.Effect on Tensile strength of concrete.

4.Compa1ison of result of different tests with varying proportion

fiber with normal concrete and fiber mixed concrete

II.METHODOLOGY

A preliminary study on compressive strength, tensile strength and flexural using different proportions of fibers resulted in a varying ratio of the Palm Husk and Corn Husk fiber percent by volume of concrete. In the present study, experimental concrete cubes of size 150mm x 150mm, in thickness of 150mm and cylinder of diameter 150mm and height of 300mm, both with PCC (plain concrete) and fiber reinforced concrete with experimental fibers were cast and tested for compression, tensile for 7 and 28 days of curing. A concrete prism of size 150mm x 150mm x 500mm were casted and tested for flexural strength after 7 ,21 and 28 days. fiber reinforced concrete can be in general produced using conventional concrete practice, though there are obviously some important differences. The basic problem is to introduce a sufficient volume of uniformly dispersed to achieve the desired improvements in mechanical behaviour, while retaining sufficient workability in the fresh mix to permit proper mixing, placing and finishing. The performance of the hardened concrete is enhanced more by fibers with a higher aspect ratio, since this improves the fiber-matrix bond. On the other hand, a high aspect ratio adversely affects the workability of the fresh mix. In general, the problems of both workability and uniform distribution increase with increasing fiber length and volume. fiber reinforced concrete can be placed adequately using normal concrete equipment. It appears to be very stiff because the fibers tend to inhibit flow; however, when vibrated, the material will flow readily into the forms. It should be noted that water should be added to fiber reinforced concrete mixes to improve the workability only with great care, since above a w/c ratio of about 0.5, additional water may increase the slump of the fiber reinforced concrete without increasing its workability and place ability under vibration. The finishing operations with fiber reinforced concrete are essentially the same as for ordinary concrete, though perhaps more care must be taken regarding workmanship

IV. FUTURE SCOPE

It is also expected that the final outcome of the project will have an overall beneficial effect on the utility of fiber concrete in the field of civil engineering construction work. Following parameters influences behavior of the fibre concrete, so these parameters are kept constant for the experimental work Thus, the scope of the project can be summarized as:

1. To obtain Mix proportions of Control concrete by IS method.

2. To perform the specific gravity test, sieve analysis and slump test under Indian Standard methods.

3. To conduct compressive strength, split tensile test using with and without fibre as per Indian Standard methods.

V.CONCLUSION

In the light of the preceding results and discussion, the following can be concluded:

a) The addition of fibers effect on the compressive strength has increasing by 24.15% with (Mix-4) of fiber than start increasing and then decreases by with increase the fiber quantities.

b) The increase in Palm Husk fiber showed an increase in compressive strength to the normal mix. But in case of Corn Husk showed a decrease of 7 to the normal mix

c) The results of the splitting tensile strength tests show that, there is a increase in strength by increasing fiber. it was found that highest splitting tensile strength was achieved by Mix-5 of fibers, which was found about 5.39 N/mm2 compared with other mix. The load carrying capacity is increased to 28.02 % compared with the conventional specimen.

d) Based on the experimental test result there is an improvement in Flexural strength of the Mix-4 mix is higher at age of 7,21 &28 days respectively compared to all other mixes.

e) High quantities of fiber produced concrete with poor workability and segregation, higher entrapped air and lower unit weight. f) A significant effect on the mode and mechanism of failure of concrete cylinders in a comp. testing with (FRC). The fiber concrete fails in a more ductile mode. h. From acid attack, has been observed that the weight of specimen decreases maximum upto 12.24% at Mix-I after acid attack and after MixI it starts more decreasing and decreases upto 9.62% at Mix-5

i. From Sulpahte attack, It has been observed that the compressive strength decreases maximum upto 8.6% at Mix-3 after acid attack and after Mix-3 it starts more decreasing and decreases upto 9% at Mix-5. j. From Sulpahte attack, it has been observed that the weight of specimen decreases maximum upto 2.86% at Mix-I after acid attack and after Mix1 it starts more decreasing and decreases upto 5.14% at Mix-3.

k. From the pullout strength results, found that pull out strength of concrete increases with increase on fiber content. Due to addition Mix-3 fibers, the increase in pull out strength was observed to be 38.9% when compared with the conventional concrete. This shows that there is tremendousincrease in the pull out strength of concrete due to addition of fibers.

l. The (PCC) cylinders typically shatter due to an inability to absorb the energy by the test machine at failure.

m. Fiber concrete cylinders continue to sustain load and large deformations without shattering into pieces.

n. That improve the tensile and cohesion of concrete.

o. The fiber concrete fails in more ductile mode opposite the plain concrete that shattering into pieces. This mix can be used advantageously over normal concrete pavement. fibers are being used due to their cost effective as well as corrosion resistance. FRC requires specific design considerations and construction procedures to obtain optimum performance. Resistance to change though however small disturbs our society, hence we are always reluctant to accept even the best. Its high time that we overcome the resistance and reach for the peaks. FRC opens a new hope to developing and globalizing the quality and reshaping the face of the "True Indian Structures"

VI.REFERENCES

[1] Amon Bentur& Sidney Mindess, Fibre reinforced cementitious composites" Elsevier applied science London and Newyork 1990.

[2] Correia, J.R.; de Brito,J.; Pereira, A.S. Yffects on concrete durabi[lity of usingrecycled ceramic aggregates. Materials and Structures, vol. 39 (2006), 169- 177

[3] De Brito,J.; Pereira, A.S.; Correia, J. R. Mechanical behaviour of nonstructural concrete made with recycled ceramic aggregates. Cement and Concrete Composites, vol. 27 (2005), 429-433

[4] [5] RM. Senthamarai, P.Devadas Manoharan, Concrete with ceramic waste aggregate, CemConcr compos 27 (2005) 910-913

[5] How-Ji Chen, Tsong Yen, Kuan-Hung Chen, Use of building rubbles asrecycled aggregates, CemConcr Res 33 (2003) 125-132

[6] Gemma Rodriquez de Sensale, Strength development of concrete with ricehusk ash, CemConcr Compos 28 (2006) 158-160

[7] Khaloo AR. Crushed tile coarse aggregate concrete. Cem. Concrete Aggregate 1995; 17(2): 119-125

[8] Binici, H. (2007). Effect of crushed ceramic and basaltic pumice as fine aggregates on concrete mortars properties. Construction and BuildingMaterials, vol. 21, Issue 6, (June 2007), 1191 - 1197, 0950- 0618.

[9] ASTM International Standard, ASTM C 618 -05, Standard Test Method forCoal fly ash and raw or calcinated natural pozzolan for use in concrete.

[10] Helmuth R Fly ash in cement and concrete, Portland cement association, 1987

[11] Malahothra, V.M., Ramezanianpour,A.A., Fly ash in concrete, CANMET

[12] CLAESON Research Assistant, M.Sc.Division Of Concrete Structures Chalmers University Of Technology Goteborg, Sweden "FINITE ELEMENTANALYSIS OF CONFINED CONCRETE COLUMNS"

[13] Amit Gavali, Sneha Sawant and Mithun Sawant, "Experimental Study on Ground Granulated Blast Furnace Slag in Concrete", Imperial Journal of Interdisciplinary Research (IJIR), volume-2, July, 2016.

[14] G. Ganesh Prabhu, "Mechanical and durability properties of concrete made with used foundry sand asfine aggregate", Department of civil engineering, Chungam National University, Daejeon 305 — 764.

[15] A. Oner, S. Akyuz, "An experimental study on optimumusage of GGBS for the compressive strength of concrete", Department of civil engineering, Kocaeli University, Maslak, Istanbul 80626, Turkey.

[16] Use of waste tire steel beads in Portland cementconcrete by Christos G.Papakonstantinou, Mathew J.Tobolski (2006).

[17] Tyre rubber waste recycling in self-compacting concretebyM.C.Bignozzi, F. Sandrolini (2005).

[18] Properties of rubberized concrete containing silica byErhanGuneyisi, Mehmet Gesoglu, TurhanOzturan (2004))

[19] Co!in D. Johnston, "Fiber reinforced cements and concretes" Advances in concrete technology volume 3 — Gordon and Breach Science publishes 2001. PerumalsamyN.Balaguru, Sarendra P. Shah, "Fiber reinforced cement composites" , Mc Graw Hill International Editions 1992.

[20] Experimental Study on Steel Fiber Reinforced Concrete by A MShende(journal)

[21] Mechanical Properties of Steel Fiber-Reinforced Concrete by J Thomas(journal)

[22] R.J. Craig, "Structural applications of reinforced steel fibrous concrete". Concrete Int. Design and Construction 1984.

[23] J. Endgington, D.J. Hannant& R.I.T. Williams, "Steel fiber reinforced concrete" Current paper CP 69/74 Building research establishment Garston Watford 1974.

[24] https://doi.org/10.21203/rs.3.rs-488732/v1