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A LITERATURE REVIEW ON REPLACEMENT OF FINE AGGREGATE BY WASTE MATERIAL IN HIGH PERFORMANCE CONCRETE USING STEEL FIBRE

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Abstract: - High strength Steel-fiber reinforced concrete is being used increasing day by day as a structural material. From many years High Performance Concrete has been used in column of high rise building. High Performance Concrete (HPC) is a concrete meeting special combinations of performance and uniformity requirements that cannot be always achieved routinely by using conventional constituent sand normal mixing. Use of steel fiber in HPC is mainly for superior resistance to cracking and formation of cracks. The annual rice husk produce in India amounts is generally approximately 120 million tons. The aim of the present work will to use different waste material as a replacement of fine aggregate in HPC using steel fiber. A series of tests will be conducted to study the effect of optimum replacement of fine aggregate by different waste material and optimum use of steel fiber.

Keywords: High performance concrete, steel fibre, replacement, waste material

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INTRODUCTION

ACI (American Concrete Institute) defines HPC as a specially engineered concrete, one or more specific characteristics of which have been enhanced through the selection of component materials and mix proportions. [5]

Note that this definition does not cover a single product but a family of high-tech concrete products whose properties have been tailored to meet specific engineering needs, such as high workability, very-high early strength (e.g. 30-40 MPa compressive strength in 24 hours), high toughness, and high durability to exposure conditions.[6].There is some special Characteristics of HPC like Ease of placement, Compaction without segregation, Early age strength, Long-term strength and mechanical properties Permeability, Density, Heat of hydration, Toughness, Volume stability. There are major application of HPC is Pavements, Long-span bridges, High-rise buildings and other miscellaneous application are Floor slabs, Pavements, Refractories, Hydraulic structures, Thin shells, Rock slope stabilization, Mine tunnel linings, Many precast products etc.

A Sumathi, K. Saravana Raja Mohan1,Strength Predictions of Admixed High Performance Steel Fibre Concrete, International Journal of ChemTech Research ,Oct-Nov 2014 This paper determine the higher use of super plasticizers does not affect the strength of concrete but it affect the workability of concrete. They determine the use of hook end steel fibre increase the compression strength, split tensile strength and modulus of rupture. They also determine the optimum use of steel fibre is 2%.

A.M. Shende, A. M. Pande, M. Gulfam Pathan Experimental Study on Steel Fibre Reinforced Concrete for M-40 Grade, International Refereed Journal of Engineering and Science (IRJES).September 2012. In this paper they determine the 3% use of steel fibre increase the compression strength, split tensile strength and flexural strength compared to use of 0%, 1%, 2%.They also determine that increase the compression strength, split tensile strength and flexural strength to 11-24%, 12-49% and 3-41% respectively by addition of steel fibre.

M. Adams Joe1, A. Maria Rajesh, an Experimental Investigation on the Effect of GBBS & Steel Fibre in High Performance Concrete International Journal of Computational Engineering Research, April-2014. In this paper they determine optimum compressive strength achieved by the 40% replacement of cement by GGBS. They determine GGBS is use for packing between fine particles.

Wasan Ismail Khalil, Ikbal Naeem Gorgis and Zeinab Raad Mahdi, Behavior Of High Performance Fibre Reinforced Concrete Columns, ARPN Journal of Engineering and Applied Sciences, November 2012. The ratio of longitudinal and transvers reinforcement slightly effect on strength and it's also affect the stress-strain relationship in HPC. It's also determine, Increases the fibre in HPC, we gate the maximum strength of the concrete. The steel fibre High performance concrete columns after concrete cracking increases as the fibres aspect ratio is increased.

P. Ramadoss, K. Nagamani, Impact characteristics of high-performance steel fibre reinforced concrete under repeated dynamic loading International Journal of Civil Engineering, December 2014. In this paper they determine addition of steel fibres to silica fume concrete significantly enhances modulus of rupture and toughness. Silica fume and steel fibres have the synergistic effect that brings the combined effect of both the materials into play in concrete matrix. They also determine Residual impact strength ratio and crack resistance factor of HPSFRC at 28-day obtained are about 1.3 and 71.2, respectively, and at 56-day the values are 1.2 and 55, respectively.

B. Siva Konda Reddy, Effect of Addition of Steel Fibres on Strength and Durability of High Performance Concrete, Journal of Engineering Research and Studies, Sept., 2012 The HPC studied in this research program has determine Addition of micro-silica to plain concrete up to7.5% reduces HPC permeability, but further addition does not reduce the permeability. Addition of micro-silica more than 10% makes the concrete harsh, dry and difficult to work.. They also determine that addition of steel fibre to HPC increased the resistance to chloride ion penetration.

Abhinav S. Pawar, K. R. Dabhekar, Feasibility Study Of Concrete Based Pavement By Using Fibres & Cementing Waste Materials, International Journal Of Research In Engineering And Technology, May-2014, In this paper they determine optimum use of GGBS the compressive strength and flexural strength increases but higher use of GGBS the compressive strength and flexural strength decreases. It also determine the, Portland cement concrete gives the higher strength after 56 days.

CONCLUSION

1) From this review literature, the optimum use of steel fibre as per the design and shape of the steel fibre. Further the compressive strength, split-tensile strength and flexural strength decreases with the increases steel fibres.

2) Optimum replacement of fine aggregate by the waste material for better packing between fine particles and reduces the cost of the project.

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