Effect of Addition of Glass in Concrete - A Review

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Abstract: The main aim of this paper is to understand the behavior of different kind of concrete mixes under the influence of addition of glass fibers as an additive or as a replacement**.** Few works on different concrete mixes and types have been studied and their properties such as compressive strength, flexural strength, workability etc. have been seen. From these extensive works performed it was concluded that the use of glass as an additive or substitute material in concrete will enhance its properties.

Index Terms **– Durability, Concrete, Sulphate attack, Acid attack, Chemical attack.**

I. INTRODUCTION

Concrete has been used in several construction works in the entire world for about last two decades. The recent developments in design it has become a necessity to add chemicals or minerals or both to improve concrete performance. Therefore different admixtures like fly ash, rice husk ash, stone dust, fibers etc. have been used. One of the profound fibers been used are the glass fibers. His paper is an attempt to summarize the intensive works performed by various researchers on glass fibers and its effect on concrete in terms of compressive strength, flexural strength, workability etc.

II. REVIEW PAPERS

J. D. Chaitanya Kumar et al. made an attempt to study the behavior of glass fiber in concrete. Their main aim was to study the effect of addition of glass fiber in concrete. In this study they added 0.5, 1.0, 2.0 and 3.0%of glass fibers. They concluded one percent of glass fibers as the optimum dosage for concrete.

Komal Chawla and Bharti Tekwani This paper outlined the experimental investigation conducted on the use of glass fibers with structural concrete. Cem-fill anti crack, high dispersion, alkali resistance glass fiber of diameter 14 micron, having an aspect ratio 857 was employed in percentages , varying from 0.33 to1 percentage by weight in concrete and the properties of this Fiber Reinforced Concrete (FRC) like compressive strength, flexure strength, toughness, modulus of elasticity were studied. They concluded that addition of glass fibers improved the tensile and compressive strength of the concrete.

A. Upendra Varma and A.D. Kumar worked on to improve the concrete properties by addition of glass fibers and named the system as alkali resistance glass fibre reinforced concrete. In their experimental investigation the alkali resistance Glass Fibres has been used to study the effect on split tensile strength, compressive strength and flexural strength of M20, M40 and M60 grades of concrete

Md.Abid Alam et al. made a total of 8 mixes with varying percentages of glass fibers and grade of concrete mixes. According to their experimental results they quoted that the compressive strength of the mix increased by 26.19% and the tensile strength increased by 25.4%. However they discovered that the workability of concrete mixes is not much affected by the addition of fibers.

Ronak Prakash kumar Patel et al. studied that the addition of glass fibers into the concrete mixture marginally improves the compressive strength at 28 days. It was observed from the experimental results, that the compressive strength of concrete, flexural strength of concrete, splitting tensile strength of concrete increases with addition of Percentage of glass fibers. 0.1% addition of glass fibers into the concrete shows better result in mechanical properties and durability.

R. Gowri and M. Angeline Mary added Glass wool fiber in the concrete to increase the strength as compared to the conventional concrete at lower cost. The strength parameters of concrete such as compressive strength and tensile strength were studied by varying the percentage of fiber from 0.025% to 0.075% of the weight of concrete. The found that the maximum increament was at 0.075%.

B.Swathi et al. made a feasibility study to use Fly ash and Glass powder as partial replacement of Cement and Fine aggregate respectively. An attempt was made to investigate the strength parameters of concrete i.e compressive and tensile strength at 28days of duration. They obtained 10% fly ash and 20% glass fiber as the optimum replacement.

T.Subramani and A.Mumtaj replaced sand with Glass fibers by 5, 10, and 15 % to produce Glass fiber Reinforced Concrete the Glass fiber Reinforced Concrete was tested for Compression, split tension and flexural strengths. They concluded 10% of glass fiber to be the optimum replacement.

Yogesh Iyer Murthy et al. determined the compressive strength, flexural strength and workability of varying glass fiber percentage concrete mix and compared the results with normal M – 30 concrete mixes. They concluded significant increment in flexural strength. However there was not much increase in compressive strength.

III. CONCLUSION

From the post works carried out on glass fibers it can be concluded that addition of glass in concrete will improve its strength characteristics. It is concluded that the compressive and tensile strength of concrete is improved by the addition of glass. It may be due to the silica content in glass. However, long term effects of glass in concrete are still a mystery.

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