A Review: Assessment of Compressive Strength of Concrete Blocks using Different Fibers

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Abstract— In this research sustainable development of the built environment in developing countries is a major challenge in the 21st century. The use of local materials in construction of buildings is one of the potential ways to support sustainable development in both urban and rural areas. This research describes the behavioral study of different fibers in concrete structure. Because these posses good binding property in concrete. Many researches are being conducted to make concrete more sustainable and of more strength and durability. Therefore keeping this in mind we have chosen to do the comparative study regarding the strength of normal concrete with the different fiber added concrete using mix design procedure as per IS 10262-2009 for M35 grade concrete.

Key words: Concrete Blocks, Fibers

I. Introduction

Concrete is made from cement, coarse aggregate (gravel or crushed stone), fine aggregate (sand), water and/or admixtures. To develop sustainable concrete, the primary materials can be replaced by aggregates made from recycled concrete. Waste materials from other industries can be used to produce additions such as jute fiber, plastic fiber, fly ash, slag, glass fibers, rice husk ash, sewage sludge ash, waste ceramics, tungsten minpolyproplene fibers and recycled glass, etc. Fiber-reinforced concrete is concrete that uses other materials mixed in with the still liquid cement to reinforce the concrete structure. These fibers facilitate build the concrete stronger and a lot of resistant to temperature extremes. They also improve the concrete's water resistance.

A. *Portland Pozzalana Cement*

In India's, so far PPC is considered equivalent to 33 grade OPC, limits of fly ash content from 25% to 35%. PPC can be used in all situations where OPC is used except where high early strength is of special requirement. As PPC needs enough moisture for sustained pozzolanic activity, a little longer curing is desirable.

B. *Aggregates*

Aggregates which occupy nearly 70 to 75 percent volume of concrete are sometimes viewed as inert ingredients in more than one sense. However, it is now well recognized that physical, chemical and thermal 'properties of aggregates substantially influence the properties and performance of concrete. Proper selection and use of aggregates are important considerations, both economically as well as technically. Aggregates are generally cheaper than cement and imparting greater volume stability and durability to concrete.

C. *Fiber*

Concrete is one of the most versatile building materials. Concrete is strong under compression yet weak under tension, brittle and limited ductility material. Therefore, a form of reinforcement is needed; steel bars reinforce concrete against tension only locally. Cracks in reinforced concrete members extend freely until encountering a rebar. The most drawback with workability of steel fiber concrete is in obtaining correct distribution of the fibers so they do not mishandle. This issue is sometimes overcome by slow, continuous and uniform feeding of the fibers into the wet or dry combine by means that of moving feeders. generally the fibers square measure undergone screens as they're introduced. correct feeding will nearly eliminate the matter of balling. Addition of water to enhance workability will scale back the flexural strength significantly; a vital matter once one considers that one in all the most reasons for victimisation steel fibers is to enhance the flexural strength. In such cases use of appropriate admixture in all probability would improve the workability to sure extent and should to not the extent that you just need

D. *Steel Fibers*

Steel fibers are filaments of wire, deformed and cut to lengths, for reinforcement of concrete, mortar and other composite materials. It is a cold drawn wire fiber with corrugated and flatted shape.

E. *Polypropylene Fibers*

Polypropylene fibers area unit new generation chemical fibers. they're factory-made in large scale and have fourth largest volume in production when polyesters, polyamides and acrylics. Regarding four million tons of plastic fibers area unit made within the world during a year.. Relatively lightweight in weight compared to the normal stones. Its installation is quick and relatively easy.

- GFRC has the characteristics to be forged into virtually any form.
- GFRC consists of materials that square measure unlikely to burn. The concrete takes the role of a thermal regulator whereas exposed to fireplace and protects the materials from the flame heat.
- GFRC is skinny and powerful, with weight being seventy fifth to ninetieth less compared to solid concrete. Less weight facilitates straightforward and speedy installation, and additionally decreases the load applied on the structure. the sunshine weight and hard material additionally minimizes the transportation expenditures, permits flexibility in style, and reduces the impact on atmosphere.
- Superior strength enhances the power to endure unstable masses.
- GFRC is a smaller amount susceptible to weather effects and additional proof against freeze thaw than the conventional concrete.

II. LITERATURE REVIEW

Gaochuang Cai and Herve Degee (2017) Were concluded that "While there are many experimental investigations focusing on seismic behaviour of fibre reinforced concrete (FRC) columns, the studies regarding the accuracies and conservativeness of existing seismic strength models of FRC columns are limited. This paper presents a seismic research database of 322 FRC columns obtained from a comprehensive literature investigation. The comparative results verify the feasibilities and accuracies of the assessment method in FRC columns."

M.G. Alberti etal (2016) were concluded that "Polyolefin based macro-fibers have proved their good performance for the structural reinforcing of concrete with fracture behaviour comparable to that of steel fibres but being chemically stable. Their adhesion to cementitious matrix is enhanced by surface treatments and embossed shapes. However, there is a lack of research about their pull-out behaviour and microstructural interface property. In this study, pull-out tests were designed by synchronising the testing machine with a video-extensometer device. The tests were performed with polyolefin fibres embedded on mortar and self-compacting concrete specimens. Six embedded lengths were used, with their inclination varying from 0° to 60°. The results provided significant information about the pull-out load and the energy absorbed in the process. Microstructural analyses provided a detailed view of the interface between polyolefin fibre and cement paste. The continuity between CSH gel and polyolefin fibres exhibited a sound interface between polyolefin fibres and cement paste, without either voids or discontinuities."

M. Briffaut etal (2016) were concluded that "The early-age cracking of concrete structures increases permeability and diffusivity and moreover accelerates the penetration of liquid, gas and aggressive agents. Consequently, the serviceability of these structures could be reduced drastically. Early-age cracking might be due to external loading, but also to the internal or external restraint resulting from autogenous, drying and thermal shrinkage. This study focuses more specifically on these latter phenomena."

T. Tahenni etal (2016) were concluded that "Shear failure of reinforced concrete beams is generally affected by a large number of parameters among which the *a*/*d* ratio (shear-span/effective depth) is the most important. The other main parameters are the compressive strength, the longitudinal reinforcement ratio, the aggregate and the presence of transverse stirrups. The addition of steel fibers as reinforcement could be another parameter which contributes to the shear resistance. Such shear contribution will be assessed qualitatively and quantitatively for high strength concrete in the present work.

Twenty four steel fiber reinforced high strength concrete beams without stirrups and with stirrups were tested in bending under two concentrated loads; the concrete beams were designed to have a pronounced shear behavior. The possibility of replacing traditional transverse reinforcement by steel fibers was studied. In this sense, the main testing parameters were the volume fraction of steel fibers, the aspect ratio of fibers and the presence of stirrups; five volume fractions of fibers were used (0%; 0.5%; 1.0%; 2.0% and 3.0%), with two aspect ratios (l_f/d_f of 65 and 80). The experimental results show that the shear behavior of the fiber reinforced high strength concrete beams without stirrups is similar, if not better, to that of high strength concrete beams containing stirrups reinforcement. The fiber reinforced beams had very narrow diagonal cracks and improved shear strengths, particularly for fiber fractions from 1% to 3%. Based on the present experimental work, a new empirical model is proposed for the contribution of the fibers to the shear strength of high strength concrete beams. The proposed model was assessed against other existing models and against varied experimental data taken from the literature and found relatively more satisfactory."

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