International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 07 | July - 2021 ISSN: 2582-3930

STUDY OF USE OF GLASS FIBRE REINFORCEMENT IN STRENGHENING OF CEMENT CONCRETE

Mr.Ashwani Kumar Pandey(Professor, Department of civil Engineering, BBDITM, Lucknow, India)

Uttam Jaiswal (B.Tech Scholar, Department of Civil Engineering, BBDITM, Lucknow, India)

Udbhav Pandey (B.Tech Scholar, Department of Civil Engineering, BBDITM, Lucknow, India)

Tanmay Singh (B.Tech Scholar, Department of Civil Engineering, BBDITM, Lucknow, India)

ABSTRACT

Glass-fiber reinforcements concrete (GRC) is a fabric made from a cementitious matrix composed of cement, sand, water and admixtures, wherein brief period glass fibers are dispersed. It has been broadly used withinside the creation enterprise for non-structural elements, like facade panels, piping and channels. GRC gives many advantages, including being lightweight, hearthplace resistance, exact look and electricity. In this look at trial assessments for concrete with glass fiber and without glass fiber are carried out to signify the variations in compressive electricity and flexural electricity through the use of cubes of various sizes. Various programs of GFRC proven withinside the look at, the experimental check results, techno-financial assessment with different types, in addition to the monetary calculations presented, suggest the superb capacity of GFRC as an opportunity creation fabric. It is now properly set up that one of the critical residences of fiber bolstered concrete is its advanced resistance to cracking and crack propagation. As a end result of this capacity to arrest cracks, fiber composites own improved extensibility and tensile electricity, each at the beginning crack and at ultimate, precise below flexural loading; and the fibers are capable of maintain the matrix collectively even after full-size cracking. The internet end result of these kind of is to impart to the fiber composite said post – cracking ductility that's remarkable in everyday concrete. The transformation from a brittle to a ductile kind of fabric might boom substantially & the power absorption traits of the fiber composite and its capacity to face up to again and again applied, surprise or effect loading. In this paper, the mechanical residences of triangular form polyester fiber, and programs of FRC are discussed. Keywords – Glass Fiber, RCC, GRC, Construction

INTRODUCTION

Concrete is the maximum broadly used creation fabric has numerous suitable residences like excessive compressive energy, stiffness and sturdiness regular environmental factors. At the equal time concrete is brittle and susceptible in anxiety. Plain concrete has deficiencies, low tensile energy and a low stress at fracture. These shortcomings are normally triumph over with the aid of using reinforcing concrete. Normally reinforcement includes non-stop deformed metallic bars or pre-stressing tendons. The benefit of reinforcing and pre-stressing era utilising metallic reinforcement as excessive tensile metallic wires have helped in overcoming the disability of concrete in anxiety however the ductility importance of compressive energy. Fiber strengthened concrete (FRC) is a concrete made normally of

hydraulic cements, aggregates and discrete reinforcing fibers. FRC is a tremendously new fabric. This is a composite fabric along with a matrix containing a random distribution or dispersion of small fibers, both herbal or artificial, having a excessive tensile energy. Due to the presence of those uniformly dispersed fibers, the cracking energy of concrete is improved and the fibers performing as crack arresters. Concrete is an engineering fabric that simulates the residences of rock and is a aggregate of debris carefully certain together.

1. Materials Used

2.1 Cement

All the substances that move in concrete are essential, cement is via way of means of a ways the maximum critical constituent due to the fact it is also the sensitive hyperlink withinside the chain. The feature of cement is, first to bind the sand and coarse mixture collectively and 2nd to fill the voids in among sand and coarse mixture debris to shape a compact mass.

2.2 Coarse Aggregate

The aggregate most of which may be retained on the 4.75 mm IS sieve and include only that heaps of wonderful fabric as is permitted through manner of the specifications are termed as coarse aggregate.

2.3 Fine Aggregate

It is the aggregate most of which passes through 4.75 mm sieve and contains only that much coarser material as is permitted by the specifications.

2.4 GLASS FIBER

Glass Fiber Made up from 200- 400 individual filaments can be chopped into various lengths, it is not possible to mix more than about 1% (by weight) of fibers of a length of 25mm by conventional mixing techniques

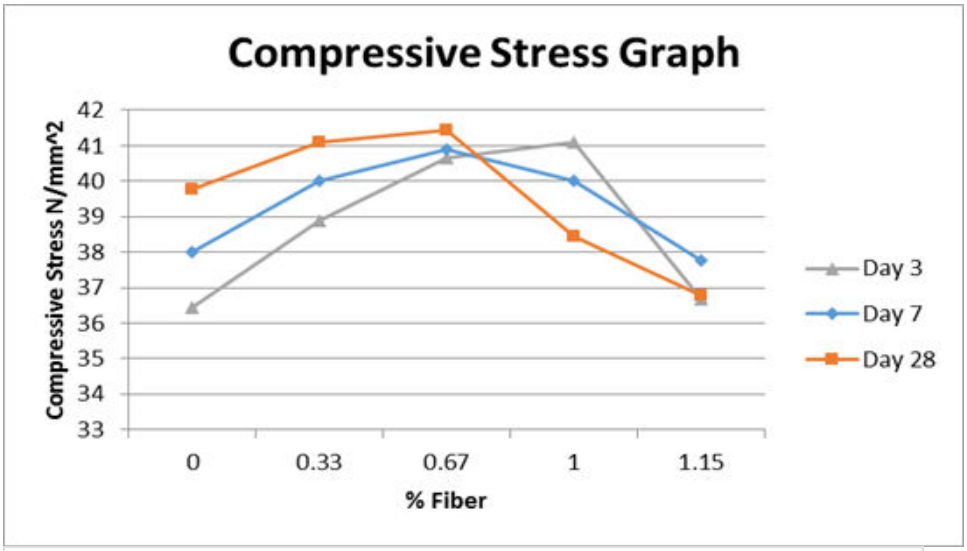
 ive ingredient of concrete. A part of blending water is employed within the hydration of cement to make the binding matrix within which the inert aggregates are held in suspension until the matrix has hardened.

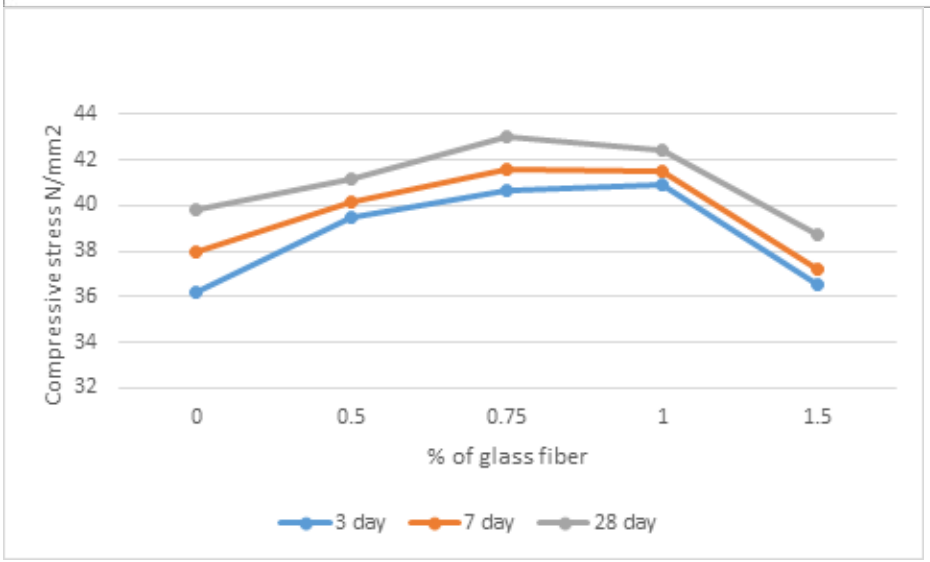
2. EXPERIMENTAL METHODOLOGY AND ANALYSIS OF RESULTS

3.1 Compressive Strength Test To study the variation in compressive strength of conventional concrete and concrete with glass fiber and glass fiber + rubber latex, three cubes of size 150 mm X 150 mm x 150 mm are made for every fraction. The fractions of glass fiber taken are 0%, 0.33%, 0.67% 1%, 1.15%.

Calculations for Compressive Strength :-

Compressive strength of cube = load at Failure(N)/Surface area of cube(mm^2)





Variation of compressive strength with % of fiber

2. Conclusion

GFRC may be used wherever a lightweight, strong, weather resistant, attractive, fire retardant, impermeable material is required. it's many physical and mechanical remarkable assets. The high lastingness that's higher then that of Steel. Modulus of elasticity commonly is higher in steel bars but low modulus dispersed glass fibers stretch and permit concrete to crack, when the concrete cracks strong glass fibers play their role and do not allow the crack to propagate hence, a current crack in several position appears. GFRC properties are captivated with the standard of materials and accuracy of production method. Steels are removed within the GFRC so, no corrosion will occur and no minimum cover is required

3. REFERENCE

1. Study of Use of Glass Fiber Reinforcement in Strengthening of Cement Concrete by Vallance Neal ,
2. Physical Properties of GFRC by Stone wear company.
3. GFRC-30 Years of High Fiber Cement Composite Applications Worldwide by Graham T. Gilbert
4. Use of Composite Materials in Civil Infrastructure in Japan, Chapter 2- SHORT CARBON FIBER REINFORCED CONCRETE ,Vistas M. Karbhari ,August 1998, ISBN 1-883712-50-5
5. Concrete Reinforced with Fiber Reinforced Plastic, John Clarke, Materials World vol. 6 no. 2 pp. 78-80 Feb. 1998
6. The US department of defense handbook, Composite material handbook, Chapter2-Materials and processes – the effect of variability on composite properties1, 2.4.1 Fibers
7. Design of Reinforced Concrete Structures, according to ABA (Iranian Concrete Code) by Sh. Tahooni
8. Stromberg Architectural Study of Use of Glass Fiber Reinforcement in Strengthening of Cement Concrete, available at (www.Strombergarchitec