



Shear Behavior of Hybrid Fiber Reinforced Concrete

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ABSTRACT

In construction industry cementitious reinforced concrete are most commonly used. The materials are easily handled and easily used in the construction of reinforced cement concrete structures. The main reason for failure of reinforced concrete structure is due to brittleness. Due to stresses cracks are formed in the reinforced cement concrete structure. Which are leads deterioration of cement and concrete structures. It leads higher maintenance and costly. So, by using new cement concrete fiber reinforced concretes we can improve the properties of materials and improve the strength and durability properties. It provides very good crack resistance in reinforced cement concrete structure. So, in this generally fiber reinforced concrete is used in place of normal concrete. In this paper different types of fiber reinforced concrete are used for different purposes.

KEYWORDS: conventional concrete, reinforcement, fiber reinforced concrete, fibers.

INTRODUCTION

In this glass fiber reinforcements are used for different proportions of grade M30 concrete. After the final curing the concrete blocks are tested. It is used to determine of the concrete strength and as well as tensile strength of the concrete is determined. In this there are different types of combination of fibers are used in the cement concrete. In this strength is depends on number of fibers. The experimental tests are also done to know the strength and properties of the reinforced cement concrete structures. For any design of construction of reinforced cement concrete structures strength and durability are plays an important factor. Concrete is generally brittle in nature and it is weak in tension subjected to tensile stresses. So, we are tested to increase strength of the concrete compared to normal conventional concrete. Due to improper

design and construction most of these problems are occurs. This may result in decrease in properties and characteristics of the reinforced cement concrete structures. So, by using sufficient fibers we can improve all the strength characteristics and as well as properties also. Fibers are used not new; they are used previously in history in nineteenth century. After that there are different types of composite fibers are used in the concrete structures. There are lot of fibers are available in the construction industry. By using suitable materials, we can improve characteristics of concrete. In these fibers are differently categorized based on materials and properties.

ADVANTAGES

- Crack resistant
- More durable

- Reduce water absorption
- High strength
- Economical
- Higher modulus of elasticity
- Reduce abrasion
- Good performance
- Higher compressive strength
- Increase tensile strength
- Good flexural behavior
- Good bond
- Reduce permeability
- Good ductility

DIS ADVANTAGES

- Some workability issues
- Cost may increase
- Higher stiffness
- Voids
- Microdefects
- Honeycombs

TYPES OF FIBERS

Fibers are classified based on its size and shape and surface texture of the material. by using the above all conditions, we can decide the type of fibers.

- Natural fibers
- Artificial fibers

Most of artificial fibers are composite in nature. They are combines with other materials. Most of commonly used are as follows,

- Carbon
- Steel
- Glass
- Aramid



Fig. Glass fiber

GLASS FIBER REINFORCED CONCRETE

- High strength
- Alkali resistant
- Suitable for textile
- Insulating material
- Silica based
- Protect from environment



Fig. Poly propylene fiber

- Consists of hydrocarbon
- Plastic and fiber
- Not absorb water
- Density is low
- Lower weight
- Flexible
- Economical

FIBER REINFORCED CONCRETE

- Concrete with fibers
- Brittle in nature
- Good properties of material
- Good resistant to cracking

II. MATERIALS USED

- Fibers
- Cement
- Fine aggregate
- Coarse aggregate
- water



TESTS USED

1. fineness
2. consistency test
3. specific gravity
4. compressive strength
5. tensile strength
6. flexural strength

**TEST RESULTS
CEMENT**

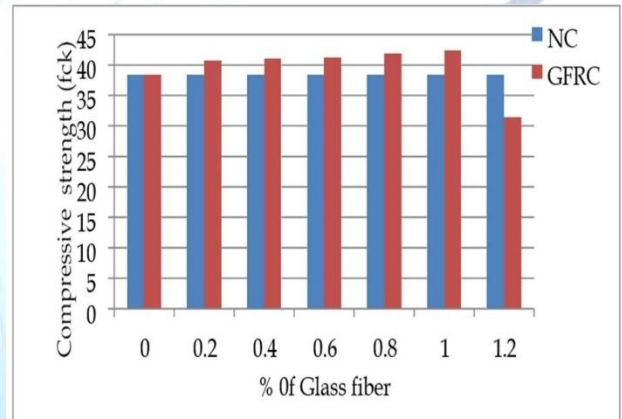
S. No	Test name	Results
1	Fineness of cement	4%
2	Specific gravity	3.15
3	Standard consistency	34%
4	Initial setting time	47 min
5.	Final setting time	330 min

POLY PROPYLENE FIBER

Property	Results
Diameter	33-35 microns
Length	12-13 mm
Tensile strength	6000 kg/cm ²
Melting point	>2500c
Dispersion	Excellent
Acid resistance	Good
Elongation	45-55%
Moisture	<1%

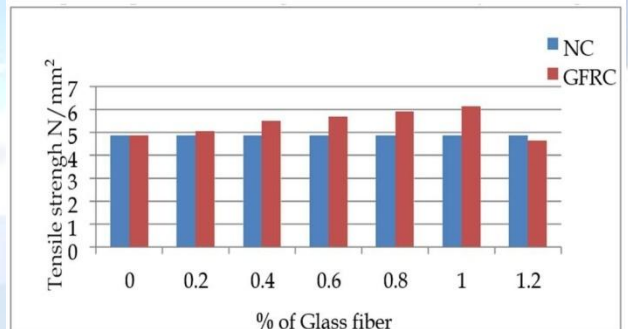
FINE AGGREGATE

S. No	Test name	Results
1	Bulk density	1.51g/cc
2	Specific gravity	2.54
3	Void ratio	0.52
4	Porosity	34.2%
5	Fineness modulus	2.75



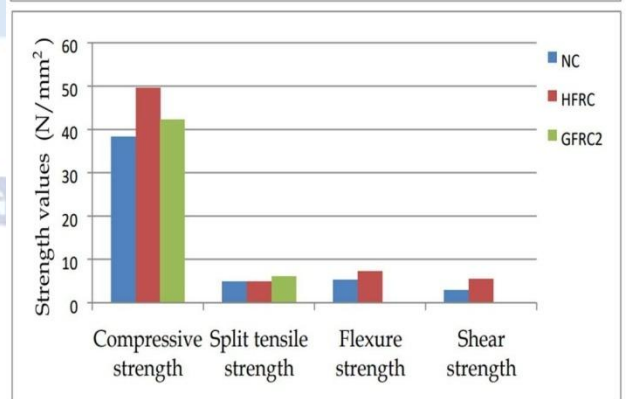
COARSE AGGREGATE

S. No	Test name	Results
1	Bulk density	1.445g/cc
2	Specific gravity	2.823
3	Void ratio	0.88
4	Porosity	50.5%
5	Fineness modulus	7.43



GLASS FIBER

S.no	Property	Values
1	Tensile strength (MPa)	4028 to 4650
2	Elongation of break %	5.81
3	Diameter (micron)	10 mm



CONCLUSION

By using these methods, we can increase strength of concrete and compared to normal conventional concrete. Glass fibers are increases strength and durability. Workability is also achieved good. Economical method to increase the properties of the reinforced cement concrete. This paper is mainly focusing on properties of concrete and strength of concrete with respect to fiber reinforcement. The results are obtained and all are with in satisfactory conditions.

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