#### Special Issue

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# Glass and Polypropylene fiber Reinforced Concrete-

### A Review

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**Abstract:** Glass and Polypropylene fiber reinforced concrete is an construction material which can be described as a concrete having high mechanical strength, also stiffness and durability. This paper presents a comprehensive review on various aspects of glass and polypropylene fiber applications and performance of glass and polypropylene fiber reinforced concrete. We can discuss about the manufacture and strength of glass and polypropylene fiber reinforced also to be discuss.

Keywords- Fiber reinforced concrete, Glass fiber, polypropylene fiber, Stiffness, Mechanical Properties

#### 1. Introduction

A good concrete must possess high strength and low permeability. Hence alternative composite materials are improve popularity because of ductility and strength hardening. To improve cracks in concrete like post cracking behavior and discrete fibers are added to the plain concrete. Addition of fibers improve the post peak ductility performance precrack tensile strength fracture strength toughness Impact resistance flexural strength etc. The ability of fibers to reduce cracks at high percentage. Addition of glass and polypropylene fibers reduces the unit weight of concrete and improve its strength.

#### 2. Glass fiber:

Concrete is the most widely used manmade construction in the overall world. At the same time

concrete is brittle and weak in tension. Glass fiber reinforced is one of the most versatile material. Glass fiber reinforced concrete product are used in architectural cladding, panels, decorative purpose, tapes etc. Glass fiber is made of natural material so that products are economically pure and not harmful to human health.



Fig: Glass fiber

#### 3. Polypropylene fiber

Polypropylene fiber is new generation chemical fiber. About 4million tones of polypropylene fibers are produced in the world in a year. Polypropylene fiber were first time suggest by for use in 1965 as a admixture in concrete for construction of blast resistant building means for the US crops of engineer. Presence of fiber reduce the settlement and bleeding in concrete. The resistance to abrasion, freeze and thaw, impact is improve.

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Fig: Polypropylene fiber

## **3.** Need of Glass and polypropylene fiber in concrete

Concrete develops micro cracks with curing and this cracks rapidly applied stress result in low tensile strength of concrete. After adding fibers in concrete to improve various properties like durability, strength, toughness, etc. Also reduce the cracks in the concrete.

#### 4. Literature review

The term fiber reinforced concrete is defined as a concrete made of hydraulic cements containing fine and coursed aggregate and discontinuous and discrete fiber[1]. We have studied many research papers the effects of various types of fibers on the mechanical properties of concrete also strength of concrete.

#### a. Workability

After adding glass and polypropylene fiber the air voids increased and hence the increased air voids reduces workability to cause difficulty of mixing. After mixing fibers the plasticizer or super plasticizers need to be add just because to maintain workability.

#### b. Compressive strength

Compressive strength of concrete is one of the most important properties of concrete. After addition of 1.5% glass and polypropylene fiber.

After investigation M15, M20 of grade concrete reinforcement with 0%, 1%, 1.5% and2% of fibers the compressive strength also increase with increase in fiber content up to 2% for all two grades of concrete.

#### c. Split tensile strength

It's a direct or indirect methods. The direct method related to holding the specimen properly in the testing machine without introducing stress concentration, and in application of uniaxial tensile load which is free from eccentricity to the specimen. Hence, indirect test are generally adopted in which a compressive force is applied to a concrete specimen in such a way that the specimen fails due tensile stresses developed in concrete due to compression on concrete uniform tensile stress is developed over nearly to 2/3 of the loaded diameter.

split tensile strength =2P/3.14DL

#### d. Flexural strength

we have studied with M15,M20 grade of concrete with 0%, 1%, 1.5%, 2% fibres for flexure and shear behaviour of the deep beam and its reported that there is increase flexure. It is observe that the flexure strength increase with content upto 0.3% at 28 days.

#### **5.APPLICATIONS**

Glass and polypropylene fibres are versatile and huge amount of industrial application such as ropes, furnishing products, packing materials, tapes, decorative purpose, plastic part stationery automotive components etc

Polypropylene fiber reinforced concrete is used for roads and pavements, drive way, machine foundation, swimming tanks etc.

#### **6.CONCLUSION**

1.Glass and polypropylene fibres reduced the water permeability, shrinkage and settelment and carbonation depth.

2. The failure is gradual and ductile in polypropylene fiber reinforced concrete.

3.To improve architectural view by using glass fiber.

4.Silica fume has no significant effect on flexural strength of concrete.

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