



## **Glass Fibre Reinforced Concrete.**

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### **ABSTRACT :**

In construction Industry, the most commonly used material is cement Concrete due to its durability, strength, workability etc. In modern world of Development, people are building very complicated structures. For this the Development of concrete with required properties is important. So Glass Fiber reinforced concrete is a modification on ordinary concrete which increases properties of concrete. Use of the waste material (glass fiber) in concrete would be a good option to some extent and a way for a sustainable approach.

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### **Introduction :**

In every developing country, Infrastructure plays an important role. And for this concrete plays a major role as, it is used in roads, building, bridges etc. Being high durability, strength, workability, high thermal resistance, weather resistance it is used in abundance in construction industry. But people are trying to make very complex and complicated structures for which ordinary concrete properties does not give much satisfaction. Need of concrete with different properties increases rapidly.

Concrete is a brittle material having high compressive strength, fatigue strength, weather resistance but its tensile strength is very low as compared to compressive strength. For this we use fibers, it may be steel fiber, glass fiber, synthetic fibers in place of aggregates.

Glass fiber increases tensile strength, compressive strength, flexural strength, crack resistance, thermal resistance etc. Glass fiber can be easily taken from. Glass industry as waste material, residue.

Fibers hold material in proper way as they are spreaded randomly in any direction and thus increase flexural and tensile strength. Also the fibers act as a barrier and prevent cracks.

Concrete is composed of cement, sand, coarse aggregate, water, admixtures but Glass fiber reinforced concrete is made with cement, sand, coarse aggregate, water and Glass fibers. Glass fibers are added at 5% of cement quantity in place of coarse aggregates.

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### **Literature Review :**

In 2011, P. Sangeetha indicated that an increase in the percentage of glass fiber relative to the weight of cement (0.1%, 0.2%, 0.3%) enhances both compressive strength and toughness, with a noted increase in compressive strength of 23%. Ahmed, Hemn et al. (2020) conducted a comparative analysis of the strength of ordinary concrete versus glass fiber reinforced concrete, assessing compressive strength, split tensile strength, and flexural strength. Their findings revealed strength increases of 20% to 30% at 3 days, 25% to 30% at 7 days, and 25% to 30% at 28 days, respectively. Jia, Daoguang et al. (2020) concluded that the average strength of concrete is maximized at 7 days when 1.5% glass fiber by weight of cement is incorporated. However, a reduction in strength of approximately 15% to 20% is observed with lower amounts (0.11%) or higher amounts (over 2%) of glass fibers, while at 28 days, the reduction is noted to be between 5% and 10%. Bazli, Milad et al. (2020) presented a study on the durability of various glass fiber reinforced polymer composites when exposed to freeze/thaw cycles, ultraviolet radiation, moisture, and other harsh outdoor conditions. Ibrahim et al. (2020) described concrete as a composite material consisting of cement, aggregate, and water, often enhanced with additives and reinforcements to achieve specific physical properties. When these components are mixed and allowed to set, they form a solid mass. Kimm, Magdalena et al. (2020) noted that the incorporation of glass fibers into concrete significantly alters its tensile strength. The fibers are strategically placed and enveloped by the matrix, enabling them to bear loads and enhance strength. Additionally, glass fibers offer high temperature resistance. This study included a carbonation test to evaluate the durability of glass fiber reinforced concrete, followed by experiments to determine its properties. Chinnadurai P et al. (2017) conducted a comparable study in Australia on fiber-reinforced concrete, subjecting it to temperatures ranging from 400°C to 800°C. The research involved a comparison with unreinforced concrete. The study indicated the use of both steel and basalt fibers. Upon increasing the temperature, it was concluded that the residual compressive strength of steel fiber-reinforced concrete surpassed that of basalt fiber-reinforced concrete as well as conventional concrete.

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**Conclusion :**

Glass fiber reinforced concrete is very useful as glass fiber increases compressive strength , tensile strength , flexural strength , Toughness , thermal resistance ,crack resistance . The complex ,complicated structures can be made using this and also the life of structure can be increased as they are corrosion resistance. Also glass fiber with Portland Pozzolana cement can be used in coastal areas as it is high water resistant and sea water resistance .