

## “A REVIEW ON PERFORMANCE OF SYNTHETIC FIBER IN CONCRETE”

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**Abstract:** As we can see the global warming issues in the atmosphere various inventions and researches has been made to minimize this effect by using synthetic fiber in concrete. Synthetic fiber is mostly preferred due to the advantages of it is compared with other materials. Different types of synthetic fibers is used in concrete for enhancing the various mechanical properties, to increase life span as they have wide range of advantages such as high ductility, resistance to plastic shrinkage during the process of curing, high tensile and compressive strength, resistance to impact, resistance to abrasion with low cost. This review aims to provide information regarding the factors affecting mechanical performance and durability of concrete and advances made with them. Different test also has been performed on synthetic fiber reinforced concrete.

**Keywords:** Synthetic fiber, compression test, impact value, plastic shrinkage etc.

### INTRODUCTION:

Synthetic fibers are thread like material which has been used in concrete as well as for various purposes. Fiber can be produced by means of different types of plants as well as vegetables and some of trees too. (Leaves, wood, bamboo, coconut shells etc) by using this materials like synthetic fiber, nylon thread and many other synthetic materials has been made. Researchers had gone through different studies regarding fiber reinforced concrete using human hair, tyre crumbles, bamboos, coconut shells etc, all this helps to achieve high tensile and compressive strength of concrete also for enhancing different mechanical properties of concrete. Normally fibers are of two main type's natural organic and inorganic fiber, inorganic fiber includes asbestos, basalt etc. and organic includes plant leaves, coconut shells, bamboo, jute, sugarcane, bananas etc. This different types of Natural fiber has been used from ancient times for construction of various structures.

The use of natural fiber becomes very effective as it is very low in budget and because of its availability also it reduces the pollution impact on earth, it is used in wide range for enhancing the behavior of concrete, it becomes very cheap and effective.

The use of synthetic fiber leads to overall development of structures, it also includes easy handling of fiber because of the property of flexibility. For the use of very high percentage of fiber in concrete, there is need to organize different methods of casing, the increasing strength of concrete is also depends up on the properties of fiber to be used, including fiber material as type of fiber, length and diameter i.e dimensions/ quantity of fiber etc. As concrete is having different deficiencies such as low tensile strength, cracking capacity, brittleness and low ductility etc, the use of rigid pavement is minimum in India, and hence bituminous pavement is preferred mainly. Plain Portland cement concrete possesses a low

tensile strength also low tensile strain capability, and hence number of micro cracks occurs during its hardening and setting process.

Fiber reinforced concrete satisfies two of much requirements of pavement materials also it is economical and reduces pollution causing parameters, which is having longer durability, cheap in cost and much more efficient compare to other materials. With the use of synthetic fiber a mesh of synthetic thread is made passing through the holes made in the mould of size 15cm\*15cm\*15cm at equal interval of distance and tied which will act like pre stressed member as concrete is fill after the threads has been tied. Synthetic fiber enhance the load carrying capacity and impermeability to water over flexible pavements, also the modulus of elasticity of synthetic fiber reinforced is more due to its flexible nature. Due to cheap in cost and its availability synthetic fiber is used in wide range also many researches are going to check the properties of concrete under use of synthetic fiber in different ways. Various test such as slump cone test, compression test, impact test, etc has been also performed.

### LITERATUR REVIEW:

K. Vamshikrishna, J. Venkateswra Rao (2014) has study “the performance of behavior of fiber reinforced concrete by using synthetic fiber” force is given to practical inquiry on mechanical properties of M20&M25 grade of concrete from incorporating synthetic fiber in the mix of reinforced concrete of rigid pavement. It has been observed that 0.3% of thread content by the weight of cement is the optimum dosage.

Amit Rai, Dr.Y.P. Joshi (2014) has conducted the partial studies and the application of fiber reinforced concrete including various fiber, they examine that compressive strength after use of synthetic fiber is much more as compared to normal strength of concrete. It increases

the flexible properties of rigid pavement also enhance various properties.

Has done the review on performance of synthetic fiber composite and detailed advance techniques made with them are described that advance made due to selection of fiber costing process, method and treatment. Mainly centered on reconstructing strength, stiffness and impact strength, containing effect of atmosphere, extensive and prolonged performance. Carry out several investigation on strength and behavior of concrete using synthetic fiber. As natural material such as synthetic thread are available easily with the hug quantity in any type of country, more detailed researches should be directed toward the different difficulties associated by using synthetic fibers.

This paper elaborates the short review of the use of synthetic fiber in concrete. The test results for concrete is obtained by the use of nylon thread embedded in zigzag pattern before casting for this purpose proper nylon thread by making a mesh of that in zigzag way. It has already reported, the results in advances made with different types of natural fiber. But investigation on use of nylon thread as a fiber are very less, literature shown the capability, strength and durability of concrete after using nylon thread. As fiber reinforced concrete is a common idea or invention or abstract from ancient times different types of fibers were used in concrete and other construction material in the form of straw and human hair (Branat 2008).

B H V Pal, Sujith Kumar C.P has done the research on high performance steel fiber reinforced self compacting concrete (SFRSCC) with silica fame. The fiber content is varying from 0 to 5% at intervals of weight of cement by 1%. The various impressing on the strength of concrete by addition of these fibers has been studied in this review.

Normally fibers having two types are natural inorganic fiber such as Basalt, asbestos....etc. and other are natural organic fiber which are coconut, jute, banana, sugarcane, bamboo...etc he has shown that slump was goes on decreasing after addition of fibers.

Has inspect the review of various natural fibers estimated in the last few years, So that it will help in approaching research of different fibers. The purpose of synthetic fibers, as reinforcement of complex,(like cement paste, mortar and concrete) is very low in budget for enhancing the properties of concrete such as toughness, tensile and compressive strength, shear strength, ductility or combining the all these.

As there are too many variations in the properties of different types of natural fibers, hence such variation has to be correctly explained as the grade of concrete is arranged.

## CONCLUSION:

By the above review it is concluded that the purpose of synthetic fiber in concrete which has occurred from natural sources from rural and urban areas, it enhance the behavior of concrete also various properties of them. And, results in cheap, tough, and realistic in rural areas where, this are comfortably available. The addition of fiber enhances the crack resistance and crack width reduced too. By using synthetic, it results in stranger, safe and economical structure and these are freely and easily available, the compressive strength of synthetic fiber composite is not affected much to certain fiber content workability of concrete is adversely affected by fiber addition, it also reduce cracks. The fracture toughness of synthetic fiber is improved.

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