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To Study the Feasibility of Basalt Fiber in the Concrete

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Abstract - *The objective of this research is to investigate and compare the compressive strength of normal concrete and Basalt Fiber Reinforced Concrete with plain M20 grade concrete. Three different fiber content were chosen i.e. 1%, 2%, 3% for each mix Fiber reinforced concrete is most widely used solution for improving tensile and flexural strength of concrete. Various types of fibers such as polypropylene, glass, steel, polyester are used in the construction industry to enhance certain properties of concrete. The basalt fibre has been introduced in different ratios i.e. 1%, 2%, 3% of overall volume of concrete block of M25 grade concrete. The experimental results demonstrated a considerable increase in compressive strength of specimen at 7 and 28 days.*

Key Words: **Basalt Fiber, Fiber reinforced Cement**

1. INTRODUCTION

In the era of skyscrapers and multi-storey buildings the responsibility upon Civil engineering construction has increased enormously due to the structural and durability requirements. This has led to tremendous research work by engineers upon various construction material and one of such material is basalt fiber which has been found to have great mechanical properties which not only increases the strength and durability of the structure but also provides resistance to cracking and crack propagation. Basalt is a natural, hard, dense, dark brown to black volcanic igneous rock formed from the solidification of molten lava. The production of basalt fiber consists of melt preparation, extrusion, fiber formation, application of lubricants and finally winding.

The function of fiber is to carry the load and provide stiffness, strength, thermal stability and other structural properties in concrete

Basalt fiber is multi performance fiber which is made from basalt rocks. It also reduces the permeability of concrete thereby reducing the bleeding of water to a significant amount. It is resistant to alkalis and acids. It is thermally, electrically and sound insulated. Basalt has a 3-dimentional molecule and when compared with single infiltrating linear polymeric fibers and has good hardness and thermal properties.

1.1 Chemical Properties

- Resistant to Acid & Alkali.
- Resistant to Ultra-Violet Rays.
- Resistant to Fungal Action.
- Prepare Your Paper Before Styling

1.2 Mechanical Properties

- The rupture stress to density ratio of basalt fibers is much greater than that of steel.
- Basalt Fibers are non-hygroscopic in nature which makes it moisture resistant.

1.3 Physical Properties:

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1.4 Thermal Properties

Basalt Fibers have a thermal range of -260^{0}C to 800^{0}C and a melting point of 1350^{0}C due to which it is suitable for fire protection and insulation protection.

2. RESULTS AND FORMATION

Laboratory tests related to the compressive strength of concrete after introduction of basalt fibre in different quantities and under different conditions were performed..The primary objective to perform these tests was to evaluate the characteristics of basalt fiber reinforced concrete and its advantageous effect.
The tests were performed according to the guidelines of IS 516:1959 to determine the compressive strength of concrete.

Table -1: 7 Days Compressive Strength Of M20 Concrete Before And After The Addition of Basalt Fibers (CF)

S.No.	Type Of Concrete	Average Strength after 7 days
1.	Normal Concrete	15.55 N/mm^2
2.	1% Basalt Fiber	18.63 N/mm^2

3.	2% Basalt Fiber	22.22 N/mm^2
4.	2% Basalt Fiber	26.22 N/mm^2

Table -2: **28 Days Compressive Strength Of M20 Concrete Before And After The Addition of Basalt Fibers (CF)**

S.No.	Type Of Concrete	Average Strength after 28 days
1.	Normal Concrete	19.90 N/mm^2
2.	1% Basalt Fiber	21.62 N/mm^2
3.	2% Basalt Fiber	24.06 N/mm^2
4.	3% Basalt Fiber	26.22 N/mm^2

It was observed that the flexural strength of concrete increases by 5.4% on adding 1% Basalt fibers by weight of cement and it increases by 7.8% on adding 2% Basalt fiber by weight of cement.

3. CONCLUSION

It is observed the overall compressive strength of concrete increases after the addition of Basalt fibers into the concrete. Hence, introducing basalt fibers to the concrete will be advantageous to the concrete in order to achieve greater compressive strength as concrete is predominantly subjected to compressive load.

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