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EXPERIMENTAL INVESTIGATION ONTHE BEHAVIOUR OF GLASS FIBER REINFORCED CONCRETE AND NOMINAL CONCRETE

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Abstract - The properties of concrete containing glass fiber were reviewedto establish their similarities and difference with normal concrete. Cement concrete specimens were cast with adding various percentage of glass fiber like 10% and 12% to the weight of the cement in order to analyze the performance of the GFRC. The E- glass fiber used to increase the strength on concrete and study the effect on compressive and flexural strength on M20 grade of concrete. 12% of GFRC to the weight of cement was found out to be the suitable proportion, which showed 25.75% increase in compressive strength and 98.02% increase in flexural strength over control concrete.

***Key Words*:** concrete, glass fibre, admixture, compressive strength, flexural strength.

1. INTRODUCTION

Concrete being the most important and widely used material is called upon to possess very high strength and sufficient workable properties. Concrete has been the most widely used in construction has several desirable properties like high compressive strength, stiffness, durability under usual environmental factors. At the same time concrete is brittle and weak in tension. Efforts are being made in the field of concrete technology to develop high performance concrete by using fiber and other admixtures in concrete up to certain proportions. To achieve the goal of considerable strength behaviors, the following objectives have been identified.

2. METHODOLOGY

To analyze the workability of the fresh concrete made by constant percentage of adding E-glass fiber. To determine the compressive strength and flexural strength of glass fiber reinforced concrete and nominal concrete. To provide safeguard to the environment. And to minimize cracks.

Methodology

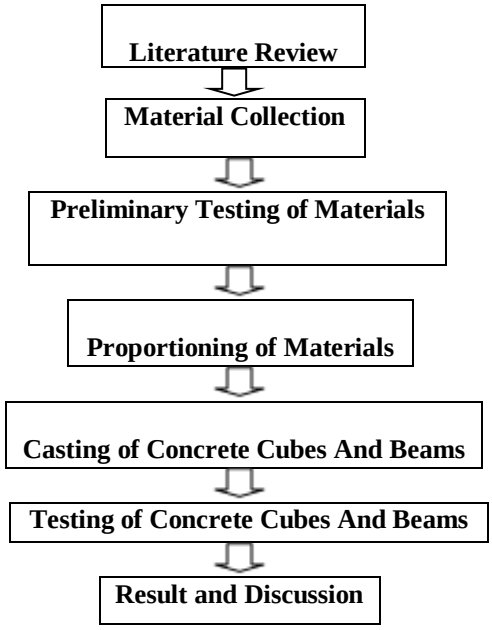

Table -1: M20 GRADE GFRC CONCRETE

S. No	Description	Quantity
1.	Cement	394 kg/m³
2.	Fine aggregate	664 kg/m³
3.	Coarse aggregate	1194kg/m³
4.	Water	171 kg/m³
5.	Admixture (1.1% of cement)	4.3 kg/m³
6.	Water cement ratio	0.43
7.	Mix proportion	1 : 1.68 : 3.03

Table -2: M20 GRADE GFRC CONCRETE

TESTS	7DAYSCURING	28DAYSCURING
Compressive strength (N/mm2)	13.45	33.67
Flexural strength (N/mm2)	1.1	5.05

Compressive strength (N/mm2) test of GFRC

7 DAYS CURING		28 DAYS CURING	
10%	12%	10%	12%
16.56	18.34	40.44	42.34

Flexural strength (N/mm2) test of GFRC

7 DAYS CURING		28 DAYS CURING	
10%	12%	10%	12%
1.44	1.77	8.25	10

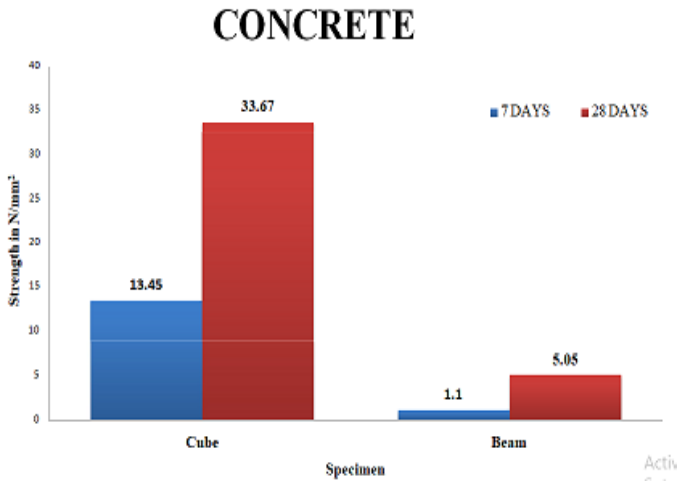

Fig -1: Result of control concrete

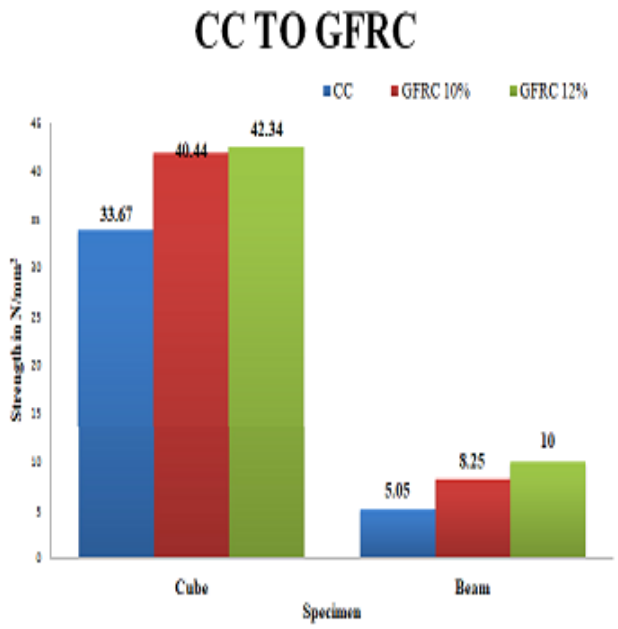

Fig -2: Strength comparison of CC to GFRC

3. CONCLUSIONS

The compressive and flexural strength of the concrete gives satisfactory results by the addition of the glass fiber. The workability of the concrete also achieved as per the design water cement ratio. Increase in percentage of compressive strength of GFRC cube over control concrete cube is 20.11% for 10% of GF, 25.75% for 12% of GF. Increase in percentage of flexural strength of GFRC beam over control concrete beam is 63.34% for 10% of GF, 98.02% for 12% of GF. The addition of glass fiber in concrete has increased the workability and reduction in bleeding.

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