

## Comparative Study of Concrete with Fibre

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**Abstract:** The purpose of this project is comparative study on concrete with fiber reinforced concrete. fiber reinforced concrete with different types of fibre reinforcement concrete was tested for compressive strength, M40 grade of concrete. Normal concrete, M20 grade was taken as control for at 28 days. Fibre reinforced concrete is increasingly used on account of the advantages of increased static and dynamic tensile strength, energy absorbing characteristics and better fatigue strength. Uniform dispersion of a fibres throughout the concrete provides isotropic properties not common to conventionally reinforced concrete. Fibre reinforced concrete has been tried on overlays of air-field, road pavements, canal lining, industrial floorings, bridge decks, explosive resistant structures, refractory linings etc.

**Keywords—** *Fibre reinforcement concrete, Glass fibre, Steel fibre reinforcement concrete, Synthetic fibre, Natural fibre etc.*

### 1. Introduction

Concrete is the most used resource or material after water in the world. Concrete plays a vital role of the development in infrastructure Viz., buildings, industrial structures, bridges and highways etc. leading to utilization of large quantity of concrete. Concrete is most widely used as building material because of its versatility. It has desirable engineering properties. There are different grades of concrete. Concrete is good in compressive strength but weak in tensile strength. Fiber increases the tensile strength of concrete. They also increase the compressive strength of concrete by small percentage. But for tensile strength it is more effective. There are number of advantages of using fibre reinforced concrete.

### 2. Related Work

**Bharath Kumar, Praveen Kumar, Prakash S.K, January (2014) [1]** In this paper, Road transportation is undoubtedly the lifeline of the nation and its development is a crucial concern. The traditional bituminous pavements of their needs for continuous maintenance and rehabilitation operations points towards the scope for cement concrete pavements.

**Gokilapriyadharshini. R, Lokesh. S and Purushothoman. S, June 2015 [2]** In this paper, Cement Concrete is the most extensively used material in construction, as it provides good ductility and can be moulded into any shape. Ordinary cement of concrete possesses a very low tensile strength, limited ductility and little resistance to cracking. It has been found that the different types of fibres added in specific percentage to concrete improves the mechanical properties, durability and serviceability of the structure.

**Saiyed Faraz Abbas Zaidi, Mohd Afaque Khan, Abhishek Kumar, March 2016 [3]** In this paper, the free vibration and seismic response of hyperbolic shells, and examines the influence of thickness, height and curvature on this response. The response of the first lateral mode is also significantly affected by a change in the parameters. Francesco

**Tejas R Patil, Ajay N. Burile, May (2016) [4]** In this paper, Road transportation is undoubtedly the lifeline of the nation and its development is a crucial concern. The traditional bituminous pavements and their needs for the continuous maintenance and rehabilitation operations points towards the scope for cement concrete pavements.

**Mamatharani.S, Dr. Anila Kumar.C.P, August 2017 [5]** In this paper, Recent researches have proved that addition of fibres to plain concrete will improve tensile strength. The primary objectives of the current project is to analyse the strength behaviour of fibre reinforced concrete with the incorporation of GI, Glass and Coconut coir as mono and the hybrid fibre and comparing the results with plain concrete.

### 3. Methodology

We studied all the process and then our implementation begins here.

We made three concrete cubes of M20 grade in which one was fibre reinforced. M 20 proportion is 1:1.5:3 where,

1 is the proportion of CEMENT

1.5 is the proportion of SAND and

3 is the proportion of AGGREGATE.

We prepared these cubes at H. A. Kanitkar Constructions & Company. We decided this place as one of our group members Gopal Jadhao has done multiple internships here and he has worked for 1 year as junior engineer here and because of his contacts to officials here are good.

Then we casted the cubes on 24 February 2019. The curing was done for 28 days.

After the final preparation, we took the cubes to the buildcon material testing and services private limited, Thergaon for compressive strength test report.



Fig. 1 Curing Of Cubes



Fig. 2 Weighing concrete cube for Compressive Strength test

#### 4. Results



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**TEST REPORT- COMPRESSIVE STRENGTH (CONCRETE CUBE TEST)**

Test Report No and Date : **BMTS/TP/0340 Date 25-03-2019**

Name & Address of customer: **Gopal Jadhav, Ganesh Kawade, Aadesh Bhingare, Swapnil Chame, Prathmesh Durgude**  
**Pimpri Chinchwad, Pune**

Project / Site : **Collage purpose**

Customer's Reference : **Test Requisition Date 23-03-2019**

Sample : \_\_\_\_\_ Test method followed, if any : **IS 516:1959 RA 2013**

a) Description : **Concrete Cube M 20** Date of Receipt : **23-03-2019**

b) Quantity : **03 No (01 Set)** Date of Testing : **24-03-2019**

c) Condition : **Acceptable** Date of Report : **25-03-2019**

Location of Concrete Member : **Site Sample\***

Grade	ID Mark	Dimension of Cube (mm)			Cross Section Area in Sq. mm	Date of Casting	Date of Testing	Age of Specimen in days	Weight of Specimen in kgs	Max Load in KN	Compressive Strength	
		L	B	H							N/Sq.mm	Kg/Sq.cm
M 20	1	150.0	150.0	150.0	22500	24-02-19	24-03-19	28	8.251	467.20	20.76	211.67
M 20	2	150.0	150.0	150.0	22500	24-02-19	24-03-19	28	8.845	519.20	23.08	235.22
M 20	3	150.0	150.0	150.0	22500	24-02-19	24-03-19	28	8.802	512.40	22.77	232.14

Remarks : \* Information based on test requisition submitted

Note:  
 01) The Remarks Given On This Report are Based on The Available Information on Test Requisition Form submitted.  
 02) The test report and result relate to the particular specimen/ sample (s) of the material as delivered /received and tested in the laboratory.  
 03) This test report may not be reproduced in part, without the permission of this laboratory.  
 04) Any correction invalidates this test reports

Page 01 of 01



Authorised Signatory



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 Lab Head  
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Fig. 3 Report of Compressive Strength Test

**Table 1 Compressive test readings**

Type of concrete	Grade	ID Mark	Date of casting	Date of testing	Age of specimen in days	Compressive Strength (N/mm <sup>2</sup> )
Standard Concrete	M 20	1	24-02-19	24-03-19	28	20.76
Fibre Reinforced Concrete	M 20	2	24-02-19	24-03-19	28	23.08

### 5. Conclusion

- We compared standard concrete block with fibre reinforced concrete block.
- We got compressive strength of standard concrete block 20.76 N/mm<sup>2</sup>.
- We got compressive strength of fibre reinforced concrete block 23.08 N/mm<sup>2</sup>.
- Hence, we conclude that fibre reinforced concrete has more strength than standard concrete block. Therefore, fibre reinforced concrete should be used for construction purposes.

### References

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