



# **iJRASET**

International Journal For Research in  
Applied Science and Engineering Technology



---

# **INTERNATIONAL JOURNAL FOR RESEARCH**

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

---

**Volume:** 10    **Issue:** VII    **Month of publication:** July 2022

**DOI:** <https://doi.org/10.22214/ijraset.2022.45976>

**[www.ijraset.com](http://www.ijraset.com)**

**Call:** ☎ 08813907089

**E-mail ID:** [ijraset@gmail.com](mailto:ijraset@gmail.com)



# Experimental Studies on Strength of Confined Concrete

Hitendra mehta<sup>1</sup>, Pushpendra Kumar Kushwaha<sup>2</sup>, Mithun Kumar Rana<sup>3</sup>

<sup>1</sup>M.Tech Research Scholar, <sup>2,3</sup>Assistant Professor, Civil Department Bhabha University Bhopal (M. P.), India

**Abstracts:** Concrete is a construction material composed of Cement, fine aggregate, coarse aggregate, and water with or without admixtures. The concrete industry is one of the heaviest consumers of natural resources due to which sustainability of concrete industry is under threat. The biggest problem facing the concrete industry is the environmental and economic concern. In this research Paper I work on waste utilization on concrete, Use of waste and by-products as cement replacement, not only makes the concrete economically viable but also solve the problem of dumping the waste product which is a major problem in India.

**Keywords:** Cement, Concrete, Pozzolanic Material, Strength, Waste Material, Stone Dust

## I. INTRODUCTION

Structures for a lifetime normally 80-100 years are planned and designed. Time-based effects or circumstances, such as a change of use, fire, earthquake, etc., may require an adjustment according to the state of the art during operation. Concrete is the world's most commonly used building material. This popularity of concrete has a huge environmental cost.

Fiber Reinforced Polymer

Fiber Reinforced Polymer (FRP) composites have been utilized in car, hardware, and advanced plane design for quite a few years, yet their application in solid building as a fortifying material is moderately later in root. Other than the advances in the field of improvement of new strands,

## II. OBJECTIVE

To Analyze Compressive strength by wrapping & coating 1.0 mm thick FRP. Considering coating length by 25%, 50% & 75% for different grades (M-20, M25, M-30).

## III. LITERATURE REVIEW

Emon et al. (2017) In Bangladesh, a case study has been carried out using methods for fiber reinforcement of low-cost, Galvanized Iron (GI) cable cables, with the aim of improving concrete performance. GI cable is actually a gentle, zinc-coated metal cable. A variety of characteristics of GI cable fibers, e.g. tensile strength, bending capability etc. have been explored and comparable with the features of metal fibers in light of the appropriate ACI and ASTM rules to evaluate the suitability of GI cable fibers in addition to metal fibers

Praganya et al. (2016) The resistance of galvanized iron (G.I), the layer encased in concrete and sorptive force are determined in this document. G.I pipe in concrete was researched extensively over the last few years. Two different thicknesses are used for G.I plates. Beton has generally strong resistance characteristics, but due to its porous nature it has suffered harm even though it is of elevated power.

## IV. EXPERIMENTAL SETUP

List of Materials use in this Experiment

- 1) Cement
- 2) Fine Aggregate
- 3) Course Aggregate
- 4) Water

## V. METHODOLOGY

The following laboratory tests were performed on aggregates as per relevant IS code and mix design of M25 and M30 grade of concrete. The laboratory test programmes are summarized below.



#### A. Physical Properties Of Coarse Aggregates (20mm And 10mm size)

- 1) Sieve analysis
- 2) Specific gravity
- 3) Water absorption

#### B. Physical Properties Of Cement

- 1) Fineness
- 2) Specific gravity

#### C. Physical Properties Of Fine Aggregates

- 1) Sieve analysis
- 2) Specific gravity
- 3) Water absorption

#### D. Mix design (M30 grade) as per IS 10262:2009.

#### E. Mix design (M25 grade) as per IS 10262:2009

#### F. Preparation Of Specimens

- 1) Concrete Cube of size 150x150x150
- 2) Concrete Cylindrical columns of Dia 150mm and length 300mm.
- 3) Concrete beams of size 150x150x700mm.

#### G. Testing of cubes for compressive strength.

#### H. Testing of beams for flexural strength.

#### I. Testing of cylindrical columns for Split tensile strength.

## VI. RESULT

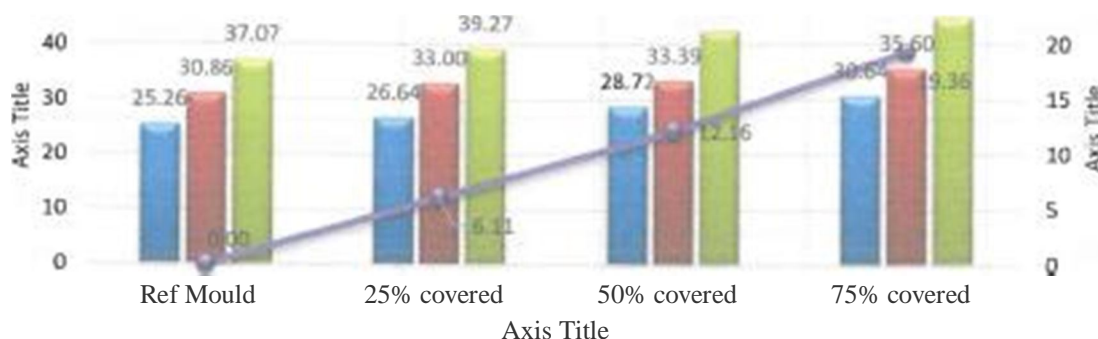
### Compressive Strength Of Concrete Cubes

Concrete crushing strength is measured by rupturing different concrete cubes with CTM at a standardized loading speed. At the end of seven days the treatment was done and three cubes tested at the end of the 28 days the treatment was carried out for each set of concrete

Compression Test Results on Different cylinders after 28 days

Sr. No.	Description	M20	M25	M30	Avg variations (%)
1	Specimen without confinement for compression test	25.26	30.86	37.07	0
2	Compression in 25% coverage	26.64	33.00	39.27	6.10
3	Compression in 50% coverage	28.72	33.39	42.49	12.20
4	Compression in 75% coverage	30.64	35.60	45.01	19.40





M20 M25 M30 -^—Strength variation (%) Pictorial representation of compressive strength of concrete cylinder in different conditions and grades.

## VII. CONCLUSION & DISCUSSION

Effect of confinement on compressive strength,

- 1) For M-20 grade of concrete the Compressive strength increase by 5.50%, 13.7% & 21.3 % for confinement of 25, 50 & 75 respectively.
- 2) M-25 grade the Compressive strength increase (%) wrapping & coating by 6.90, 8.20 & 15.3 for length coverage in (%) 25, 50 & 75 respectively.
- 3) M-30 grade the Compressive strength increase (%) wrapping & coating by 5.90, 14.60 & 21.40 for length coverage in (%) 25, 50 & 75 respectively.

Thus, it can be concluded that the compressive strength increases with respect to confinement increment.

## REFERENCE

- [1] Shamim A. Sheikh, Grace Yau, " Seismic Behaviour Of Concrete Columns Confined With Steel & Fiber Reinforced Polymers", Aci Str. Journal, 99( 1).
- [2] L. P. Ye, K Zhang , S.H. Zhao, P Feng, " Experimental Study On Seismic Strengthening Of RCC Columns With Wrapped CFRP Sheets" Construction & Building Material 17 ( 2003) 499-506.
- [3] Sohail Samadani And Shamim A Shekh "Analytical Study Of FRP Confined Concrete Columns" 2003.
- [4] Houssam A. Toutanji ,Meng Han, Stijn Matthys 'Axial Load Behavior Of Rectangular Concrete Columns Confined With FRP Composites" FRPrs-8 University Of Patras, Patras, Greece, July 16-18, 2007
- [5] A.R. Rahai, P Sadeghian, M.R. Ehsani " Experimental Behaviour Of Concrete Confined With CFRP Composites" 14th World Conference On Earthquake Engineering , Beijing China, 2008
- [6] . Hadi, Muhammad N. S." Increasing The Flexural Stiffness Of FRP Wrapped Reinforced Concrete Columns" CRC Press Netherlands 161-165.
- [7] .P. S. Padwal, Dr. S. R. Parekar " Review Paper Of Analysis Of FRP Confined Cylinders Under Axial Compression " IJSET - International Journal Of Innovative Science, Engineering & Technology, Vol. 3 Issue 6, June 2016 12-15
- [8] ParthibanL, Naveeneshwar.P "Experimental Study On Concrete Encased With Galvanized Iron" IJSET - International Journal Of Innovative Science, Engineering & Technology, Vol. 3 Issue 11, November 2016 425-427
- [9] R Lakshmi Praganya "Experimental Study On Gi Sheet Encased To Concrete And Exposed To Temperature" Ijert 2016 528-532
- [10] Md. Abul Bashar Emon Tanvir Manzur, Md. Salehin Sharif "Suitability Of Locally Manufactured Galvanized Iron (Gi) Wire fiber As Reinforcing fiber In Brick Chip Concrete"
- [11] IS 383(1970) Indian Standard Specification For Coarse And Fine Aggregates From Natural Sources For Concrete. Bis, New Delhi, India
- [12] IS-10262(2007), Indian Standard Concrete Mix Proportioning Guidelines, Bis, New Delhi, India
- [13] IS-516(1959): Methods Of Tests For Strength Of Concrete, Bis, New Delhi, India
- [14] IS-9013(1978): Method Of Making, Curing And Determining Compressive Strength Of Accelerated Cured Concrete Test Specimen, Bis, New Delhi, India.





10.22214/IJRASET



45.98



IMPACT FACTOR:  
7.129



IMPACT FACTOR:  
7.429



# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24\*7 Support on Whatsapp)