Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

Applications of Nanotechnology In Civil Engineering-2019.

Volume 6, Special Issue 01, Feb.-2019.

COLLISION OF CONCRETE PROPERTIES USING STEEL FIBER AND RE-CON FIBER

(Fiber reinforced concrete)

Devanshu Mehta1, Vidhi Pandya 2, Krishna Patel3, Titiksha Mehta4 **,** Yesha Desai**5**

[1]*Civil Department, ITM Universe*
[2] *Civil Department, ITM Universe*
[3] *Civil Department, ITM Universe*
[4] *Civil Department, ITM Universe*
[5]*Assistant Professor, Civil Department, ITM Universe*

Abstract — *Construction is a basic need of a human being. From decades to decades human is involved & living standards are also involved. To satisfy different needs different inventions and improvement in construction was initiated by engineers; civil engineering is a core branch of engineering which includes construction methods and construction materials. Concrete is a basic need of any structure. It provides strength and stability to structures. To improve the properties of concrete many different materials are used those days. One of the major material or we can say component is fiber. Fibers are of many types. It can be natural and it can be artificial. We can obtain required fibres by processing natural fibres. A fibre improves bonding between coarse aggregates and fine aggregates due to good bonding. There is increase in compressive strength. In this paper we have done experiments of compression test and spilt tensile test. And we have concluded that the tensile strength and compressive strength of concrete is increased. The tensile strength of frc is increase by 2 to 3 times.*

***Keywords*-:** *Steel fibres recon fibres, fibre reinforce concrete, tensile strength, compressive strength*

INTRODUCTION

Concrete is the basic construction material used in every type of construction work. Concrete is good in compression. For tensile strength of steel bars are provided during construction. To minimize the use of steel bar reinforcement we can provide a good tensile strength by providing proper fibre. Steel fibres are easiest and economic fibres to provide Concrete is a basic construction material used in every type of construction work. Concrete has good compressive strength but it is weak in tension. For tensile strength reinforcement a proper tensile strength.

Concrete properties without frc.

1. low tensile strength
2. low post cracking capacity
3. low ductility
4. low impact strength

Concrete with fibre reinforcement:

1. Comparatively high tensile strength.
2. Less cracking
3. High Ductility
4. High impact strength

Due to presence of fibre the post cracking of concrete is reduced.
The concrete's ductility is increase by adding fibres.

Material used for:

- IS: 456 – code of practice for plain and reinforced concrete.
- IS: 383 – specifications for fine & coarse aggregate from natural sources for concrete.
- IS: 12269 – specifications for 53 OPC.

The material used for this experimental work are cement, sand, water, steel fibre, and super plasticizer.
Cement: ordinary Portland cement of 53 grade was used in this experimentation conforming to I.S. – 12269-1987.
Sand: locally available sand zone II with specific gravity 2.65, and finesses modulus 2.92, conforming to I.S. – 383-1970.

Coarse aggregate: crushed granite stones of 20 mm size having specific gravity of 2.70, fineness modulus of 2.73 conforming to I.S. 383-1970.
Water: potable water was used for the experimentation.

Superplasticizer: to impart additional workability a superplasticizer 0.5% to 0.6% by weight of cement was used. It is based on sulphonated naphthalene polymers with following properties as per I.S. -9103-1999.

Fibres: Hook end steel fibre of dia 0.75mm & length of 60mm.

Re-con fibre of 12mm length.

Component	**Size**
Cement	OPC 53
Course aggregate	20mm
Fine aggregate	4.75 microns
Steel fibre	0.75mm dia, 50mm length hinged
Re-con fibre	12 mm length
Water	Normal tap water

I.Experimental methodology

- Compressive strength test:

1. For compressive strength test dimension of cube 150 X 150 X 150 mm were used and for M25 grade of concrete was made by adding 0% and 1% fibres by weight of cement and concrete was mould in the cube specimens.
2. Vibration was given to the moulds using table vibrator.
3. After 24hrs the concrete was demoulded and were transport to the curing tank.
4. After 7 days, 14 days, and 28days cubes were tested according to I.S. 516-1959.
5. The failure load was noted for 3 cubs each day.

Compressive strength was calculated by the following formula:

Compressive strength (MPa) = failure load/ cross sectional area

Fig.I

Results

1) Cube

9 cubes were made for experiment the compressive strength of concrete for the 7 days, 14 days and 28 days.
Target strength was 31.6 N/mm^2 due to grade of concrete at 28 days.

Day	Strength of normal concrete	Average Strength of fiber reinforced concrete (experimental)
7	16.25 MPa	23.00 MPa
14	22.50 MPa	30.60 MPa
28	25.00 MPa	35.0 Pa

- Tension strength test:

1. For tensile strength test dimension of cylinder diameter of 150mm & height of 300mm were used and for M25 grade of concrete was made by adding 0% and 1% fibres by weight of cement and concrete was mould in cylinder.
2. Vibration was given to the moulds using table vibrator.
3. After 24hrs the concrete was demoulded and were transport to the curing tank.
4. After 7 days, 14 days, and 28days cubes were tested according to I.S. 5186-2009.
5. The failure load was noted for 3 cylinder each day.

Tensile strength was calculated by following formula:

Tensile strength (MPa) = $2P/\pi$ DL

Fig.II

Results

2) Cylinder

3 cylinders were made for the test of tensile strength in fiber reinforced concrete.
Test were done for the 7 days , 14 days and 28 days.

Days	Tensile strength
7	9.1
14	13.3
28	16.2

Tensile strength of concrete varies between the 1/12 to 1/8 of compressive strength of concrete.
According to our analysis compressive strength of fiber concrete is ½ to ¼

Conclusion

- We conclude that the by adding fibers to the concrete increases its compressive strength as well as the tensile strength is also increased.
- Also using very high amount of fibers decreases the strength of concrete as well as the workability of concrete.
- By using more amounts of fibers we can reduce the cracking problem in the concrete and also sudden failure can be minimized.
- Fiber provides proper bonding within the concrete. It provides joints between the two or more aggregates also provide proper bonding with the cement mortar.
- It is seen that during three point axial test the beam does not break in to two parts sudden but the fibers provides a proper reinforcement to the beam so sudden collapse was minimize.
-

References

- https://www.iaeme.com/MasterAdmin/uploadfolder/IJCIET_08_04_019/IJ CIET_08_04_019.pdf
- http://www.ijariie.com/AdminUploadPdf/A_COMPARATIVE_AND_EXPERI MENTAL_STUDY_OF_VARIOUS_MIX_DESIGN_CONCRETE_USING_STEEL_A ND_GLASS_FIBRE_ijariie2868.pdf
- https://www.irjet.net/archives/V3/i9/IRJET-V3I950.pdf
- https://pdfs.semanticscholar.org/64b1/49cc515230c7964f1ef1837d4bed0a394c78.pdf
- IS 456 (2000): Plain and Reinforced Concrete - Code of Practice
- IS 383 (1970): Specification for Coarse and Fine Aggregates From Natural Sources For Concrete