International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 5 Issue 6, September-October 2021 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

An Trial Investigation on Fibre Reinforced Concrete Using Throw Away Polymer Fibre

Dilip Gupta[1], Dr. Anil Kumar Saxena[2]

[1]Research Scholar, [2]Professor,
[1,2]Department of Civil Engineering, LNCT Bhopal, Madhya Pradesh, India

ABSTRACT

The increasing amount of waste material from industry is a about reality that has began the sustainability complications of the environment and ecology of earth surface. The production of fibre within the industry accounts for the worldwide warming by releasing the CO2 and other harmful gases within the atmosphere during its manufacturing. It additionally method waste on the time of producing and the use of at the field. Therefore, formulation of concrete with industrial waste can help in minimizing the environmental and ecological problems. In this look at fibre (waste polypropylene fibre) become used as an extra cloth of cement concrete. Polypropylene fiber (PPF) is a artificial hydrocarbon polymer which become introduced to beautify the power of the concrete i.e. compressive and split tensile strength. In this study, we prepared number of specimens by varying percentage of commercial waste polypropylene fiber i. e. (0%, 0.25%, 0.5%, 0.75% and 1.00%). The density of Fibre ferroconcrete (FRC) was tested immediately after preparing the concrete mix whereas the compressive strength and therefore the split lastingness of the Fibre ferroconcrete (FRC) were tested after 7 and 28 days of curing. Results indicate that the density of fresh Fibre Reinforced Concrete (FRC) slightly or negligibly decreases from 2397 kg/cm3 to 2393 kg/cm3 with the addition of polypropylene fiber. The addition of waste polypropylene fiber increases the strength of Fibre ferroconcrete (FRC) for all curing ages up to a particular point. After that, there may be an abrupt discount within side the electricity of the Fibre Reinforced Concrete (FRC). The addition of 0.5% polypropylene fiber is suggested for the maximum strength with minimum coefficient of brittleness. The addition of 0.5% waste polypropylene fibre increase the compressive strength around 10% and 17% split tensile strength of the Fibre Reinforced Concrete (FRC).

KEYWORDS: *Polypropylene fiber, Fibre Reinforced Concrete, Rice Husk Ash, polyethylene terephthalate, Fibre Reinforced Mortar*

How to cite this paper: Dilip Gupta | Dr. Anil Kumar Saxena "An Trial Investigation on Fibre Reinforced Concrete Using Throw Away Polymer Fibre" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 | Issue-6, October 2021, pp.100-102, URL: www.ijtsrd.com/papers/ijtsrd46366.pdf

IJTSRD46366

INTRODUCTION

Cement-concrete is the most widely used building material in the world, there is a drive to learn more about it and improve its properties The use of waste and recycled materials in cement-concrete mixes is becoming increasingly important to deal with both municipal and industrial solid waste.

Plastic is one of the most important fabric and material innovations of the 20th century. The amount of plastic consumed annually is gradually increasing and is becoming a serious environmental problem. In order to solve the disposal of large amounts of recycled plastic material, the use of plastic in the concrete industry is seen as a sensible application.

According to some researchers, they used plastic particles that were contained as aggregates in the cement-concrete mixture and determined their physical, chemical and mechanical properties. The result showed that the addition of polymeric materials

in proportions of 10% by volume within a cement matrix does not mean any significant change in the mechanical properties of cement concrete.

A researcher calculated the use of used plastic bottle waste as a partial replacement for fine aggregates in composites for construction applications. The study shows that plastic bottles crushed into small PET particles can be successfully used as partial replacements in cement or concrete mixes, which are an attractive, inexpensive material with consistent or reliable properties and which would help solve some of the solid waste problems from manufacturing of plastics. In cement-concrete mixes were examined and compared with control samples. Only the cases where plastic is used as a fiber material in concrete are presented in this section. The different properties of different types of fibrous waste are shown. Finally, possible future studies on industrial residual polymer as fiber material in cement mortar and cement-concrete mix are evaluated in this work.

Methodology:-

To achieve the research objectives the following works are to be done:

To conduct complete literature review related to the subject of industrial waste polypropylene fibre.

Visit to the shop of waste polypropylene supplier in our city.

Bringing samples of the polypropylene fibre from the supplier.

1. Performing the physical and mechanical laboratory tests on the test samples prepared with polypropylene fibre and compared them with the available standard test results.

MATERIALS AND TESTS

Test Results for Compressive Strength of Cement

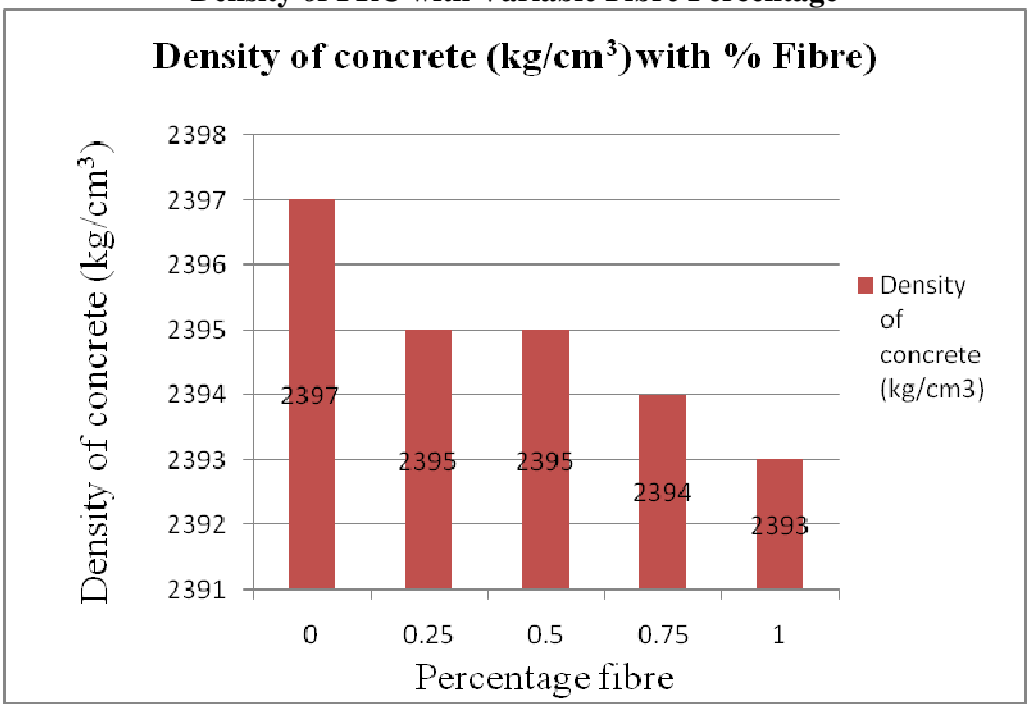
S. No.	Days	Characteristics Compressive Strength from our Tests (N/mm^2)	Value Specified by BIS: 8112-2013 for OPC 43
1	3	23.60 N/mm2	23 N/mm2
2	7	34.88 N/mm2	33 N/mm2
3	28	46.85 N/mm2	43 N/mm2

S. No.	W1 (gm)	W2 (gm)	AIV
1.	400	54	13.5
2.	400	56	14.0
3.	400	54	13.5
4.	400	52	13.0
5.	400	56	14.0

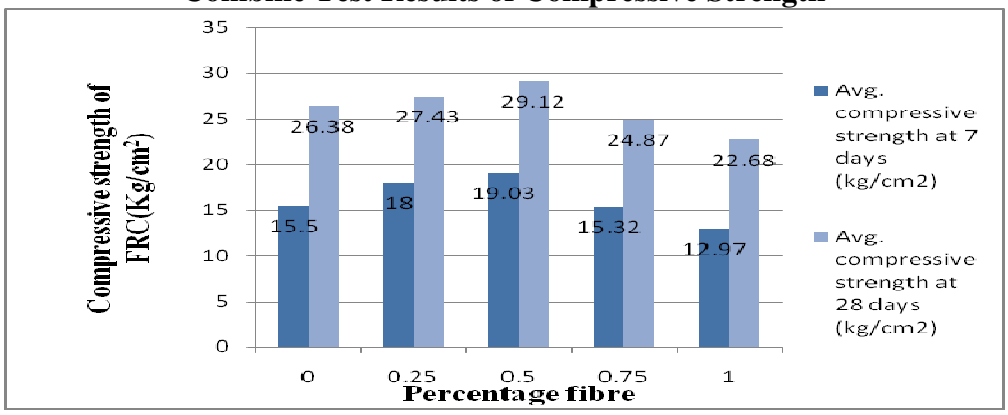
Aggregate Impact Value Test Results

TEST RESULTS AND DISCUSSION

Density of FRC with Variable Fibre Percentage



Combine Test Results of Compressive Strength



CONCLUSION

1. The addition of waste polypropylene fibre does not affect very much the density of concrete mix.
2. The gradual increase seen in the compressive strength of Fibre Reinforced Concrete (FRC) at 7 days and 28 days curing with 0.25% and 0.50% addition of fibre but after that it starts reducing the compressive strength with increase of fibre addition.
3. The gradual increase seen in the split tensile strength of Fibre Reinforced Concrete (FRC) at 7 days and 28 days curing with 0.25% and 0.50% addition of fibre but after that it starts falling the split tensile strength with increase of fibre addition.

The addition of waste polypropylene fiber increases the strength of concrete for all curing ages up to a certain point. After that there is an abrupt reduction in the strength of the Fibre Reinforced Concrete (FRC). Because at higher dosage, concrete loses its ability to make a proper bond.

REFERENCES

[1] Amit Rai et al Int. Journal of Engineering Research and Applications www.ijera.com ISSN: 2248-9622, Vol. 4, Issue 5(Version 1), May 2014, pp.123-131. http://www.academia.edu/7676360/Applications_and_Properties_of_Fibre_Reinforced_Concrete.

[2] Anon., 2003. Avoidance of waste: beneficial use of industrial by-products as constituents of concrete (The third information sheet prepared by the environmental working party of the concrete society's material group). Concrete 37 (5), 43–45. http://www.nanoient.org/JENT/Volume2/Issue2/Concrete-Made-With-Waste- Materials---A-Review/45#.WjPNSjRx3Mw.

[3] Assunc¸a˜o, R.M.N., Royer, B., Oliveira, J.S., Filho, G.R., Castro Motta, L.A., 2004. Synthesis, characterization and application of the sodium poly (styrenesulfonate) roduced from waste polystyrene cups as an admixture in concrete. Journal of Applied Polymer Science 96, 1534–1538. http://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-6f3da1f4-a1e2- 4ca5-ad8d-79b83d054050.

[4] Balaguru P.N. and Shah S.P., 1992, Fibre-Reinforced Cement Composites, McGraw- Hill Inc., New York, United State of America. https://www.amazon.com/Fiber-Reinforced-Cement-Composites-Perumalsamy-Balaguru/dp/0070564000.

[5] Banthia, N., Trottier, J., 1995. Test methods for flexural toughness characterization of fibre reinforced concrete: some concrete and a proposition. ACI Materials Journal 92 (1), 48–57. https://scholar.google.com/citations?user=gM_d68sAAAAJ&hl=en.

[6] Bentur A. and Mindess S., 1990, Fibre Reinforced Cementitious Composites, Elsevier Science Publishing Ltd., New York, United State of America. https://www.google.co.in/search?ei=VdEzWpDAHsLevASOwLCIAQ&q=hyperlink+for+6.%09Bentur+A.+and+Mindess+S.%2C+1990%2C+Fibre+Reinforced+Cementitious+Composites%2C+Elsevier+Science+Publishing+Ltd.%2C+New+York%2C+United+State+of+America&oq.

[7] BIS: 1199-1959 (Reaffirmed 2004): Methods of Sampling and Analysis of Concrete, Bureau of Indian Standard, New Delhi-1999.

[8] BIS: 2386 (Part I)-1963 (Reaffirmed 2002): Methods of Test for Aggregates for Concrete, Bureau of Indian Standard, New Delhi-1963.

[9] BIS: 456-2000 (Reaffirmed 2005) : Code of practice- plain and reinforced concrete, Bureau of Indian Standard, New Delhi-2000.

[10] BIS: 516-1959 (Reaffirmed 2004): Methods of tests for strength of concrete, Bureau of Indian Standard, New Delhi-2004.