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STUDY ON PERFUNCTORY PROPERTIES OF M30 GRADE OF CONCRETE WITH E-PLASTIC WASTE FIBER

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ABSTRACT

The wastage of e- plastic waste fiber can be reduced by adding in concrete. It gives high tensile strength upto optimum mixture of e-plastic waste in concrete. In this project describes the compressive strength, tensile strength and flexural strength of concrete containing with different proportion of E-plastic waste fiber like 1%, 2% and 3% and it is compared with conventional concrete. The test result shows that a significant improvement in compressive strength was achieved in the E-plastic waste fiber concrete compared to the M30 grade of concrete. Due to increase in strength of concrete we can reduce e-waste and increase the resources conservation.

Keywords: E- Plastic Waste fiber, Compressive Strength, Tensile Strength, Flexural Strengt

I. INTRODUCTION

Nowadays environmental pollution is increased day by day. E- Waste disposal one of the reason due to pollution in the environment. Atleast we can reduce that by adding e- waste in concrete. E-waste replacement in concrete gives higher tensile strength when compared to normal concrete. From the previous research we found that strength was increased in concrete due to replacement of e-waste in concrete instead of coarse aggregate [Deepa Shri & Prasannan, 2016]. Plastic fiber reinforced concrete adding into normal concrete gives compressive strength increased upto 6% [Prasannan et al., 2016]. Plastic fiber reinforced concrete gives higher split tensile strength when compared to normal concrete [Prasannan et al., 2016]. From the previous research fiber reinforced concrete successfully added and replacement into concrete, it gives higher energy absorption and optimum ductility properties

II. EXPERIMENTAL STUDY

The main objective of the study is to add E-plastic waste fiber at different proportion in order to reduce the amount of E-waste disposed on the earth. To find the higher compressive strength of concrete from the different proportion of E-plastic waste fibers are uses in this project. To compare compressive and tensile strength of normal concrete with E-plastic waste fiber concrete.

MIX PROPORTION: Materials Properties and Testing of concrete were studied based on standards [IS 383: 1970, IS 516:1959, IS 1199:1959, IS 456: 2000].

Mix Ratio for M30 grade is 1:1.39:2.57 Based on the above mix ratio, quantity of materials required for conventional concrete obtained and mentioned in table 1. Required specimen details mentioned for different mix proportion in table 2. Quantity of materials required for replacing of E-waste plastic fiber instead of coarse aggregate with different percentages of 1%, 2%, 3% are as mentionned in table 3, table 4, table 5 respectively.

Table 1: Quantity of conventional concrete:

Material/Mould	Cube	Prism	Cylinder
Cement	1.52kg	2.25kg	2.39kg
Fine aggregate	2.11kg	3.13kg	3.31kg
Coarse aggregate	3.91kg	5.79kg	6.14kg
Water	0.66litre	0.99litre	1.04litre

Table 2: Specimen Details:

Mix specification	M 30 Mix	mix (1)	mix (2)	mix (3)
E-plastic waste fibe (%)	(0)	1	2	3

Table 3: Quantity of material for 1%:

Material/Mould	Cube	Prism	Cylinder
Cement	1.50kg	2.36kg	2.34kg
Fine aggregate	2.09kg	3.28kg	3.25kg
Coarse aggregate	3.86kg	6.07kg	6.01kg
Water	0.66litre	04litre	1.03litre
E-waste	0.08 kg	0.13 kg	0.13 kg

Table 4: QUANTITY OF MATERIAL FOR 2%:

Material/Mould	Cube	Prism	Cylinder
Cement	1.49 kg	2.34 kg	2.31 kg
Fine aggregate	2.07 kg	3.25 kg	3.21 kg
Coarse aggregate	3.83 kg	6.01 kg	5.94 kg
Water	0.66litre	1.03 litre	1.02 litre
E-waste	0.16 kg	0.26 kg	0.25 kg

Table 5: QUANTITY OF MATERIAL FOR 3%:

Material/Mould	Cube	Prism	Cylinder
Cement	1.47 kg	2.31kg	2.29kg
Fine aggregate	2.04 kg	3.21kg	3.18kg
Coarse aggregate	3.78kg	5.94kg	5.89kg
Water	0.65litre	1.02litre	1.01litre
E-waste	0.25 kg	0.39 kg	0.38 kg

COMPRESSIVE STRENGTH TEST RESULTS:

Compressive strength of concrete cubes was tested. Based on the test results we compared strength of conventional concrete with E-Waste plastic fiber concrete and represented in graphically as shown in fig 1.

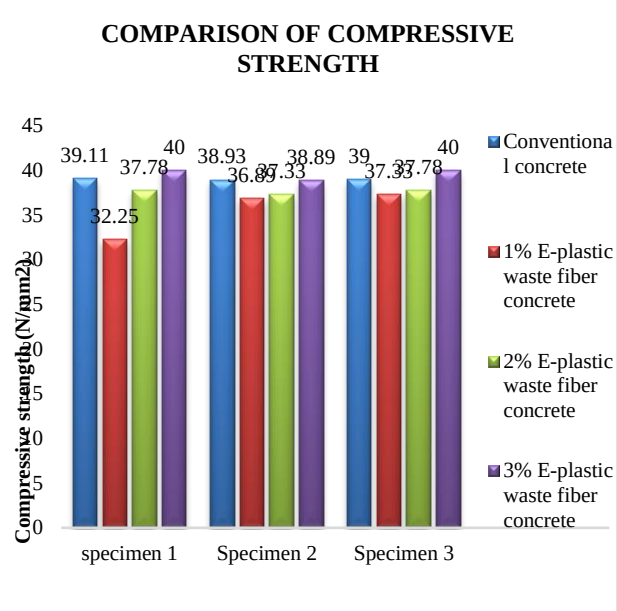

Fig 1: Compressive Strength of Concrete Cubes

SPLIT TENSILE STRENGTH TEST RESULTS:

Split tensile strength of the concrete cylinders was tested. Based on the test results we compared strength of conventional concrete with E-Waste plastic fiber concrete and represented in graphically as shown in fig 2.

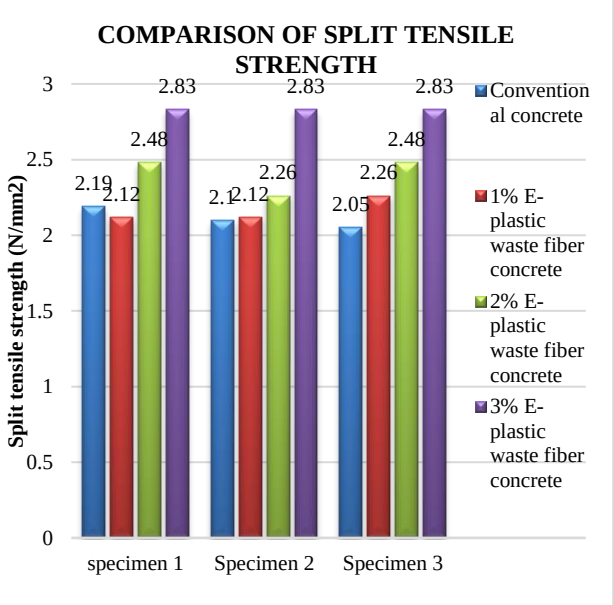

Fig 2: Split Tensile Strength of Concrete Cylinders

FLEXURAL STRENGTH TEST RESULTS:

Flexural strength of concrete prisms was tested. Based on the test results we compared strength of conventional concrete with E-Waste plastic fiber concrete and represented in graphically as shown in fig 3.

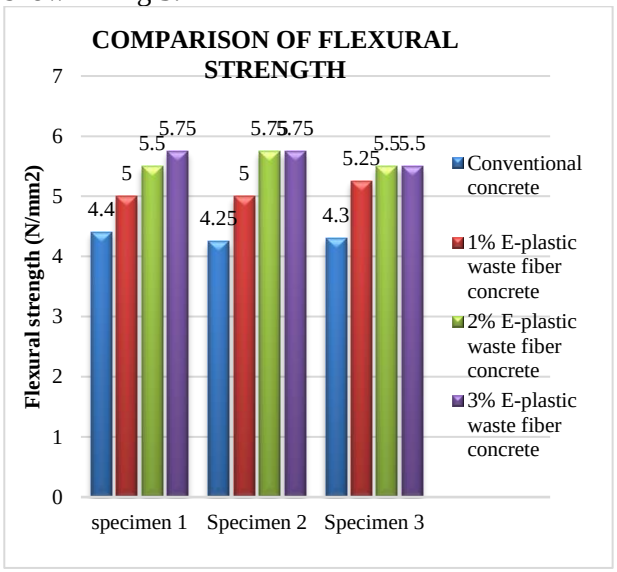

Fig 3: Flexural Strength of Concrete Prisms

III. RESULTS AND DISCUSSION:

In E-plastic waste fiber concrete, we add fiber as the aspect ratio is 10, length is 1.5 cm and their edges are rough due to the edge characteristics the bonding strength of the concrete is increases.

Unit weight of E-plastic waste fiber concrete is 2420 kg/m^3

It gives the compressive strength, split tensile strength and flexural strength of concrete is slightly more than conventional concrete.

The mechanical properties of the E-plastic waste fiber concrete may be increases or decreases while addition of this fiber more than 3%. Because the strength of the concrete is increases constantly from 1% to 3% based on our project.

In this project we use E-plastic waste fiber into concrete up to 3%. By using this fiber into concrete we can protect our surrounding environmental from the toxic gases and its effects.

CONCLUSION:

It identified that E-waste can be disposed by using them as construction materials.

Its use will also help in protecting the environment surroundings.

The compaction factor shows the workability of the concrete is good.

The addition of E-plastic waste fiber shows increases in compressive strength, split tensile strength and flexural strengthen 3% when compare to 1% and 2%.

The maximum compressive strength of E-plastic waste fiber concrete cube is 40 N/mm^{2}whereas

the maximum compressive strength of conventional concrete is 39 N/mm^2.

The maximum split tensile strength of E-plastic waste fiber concrete cylinder is 2.83 N/mm^2 whereas the maximum split tensile strength of conventional concrete is 2.19 N/mm^2.

The maximum flexural strength of E-plastic waste fiber concrete prism is 5.75 N/mm^2 whereas the maximum flexural strength of conventional concrete is 4.4 N/mm^2.

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REFERENCES

Bureau of Indian Standards: IS-456, Plain and Reinforced Concrete- Code of Practice, New Delhi, India (2000).

Bureau of Indian Standards:IS-516, Method of Test for Strength of Concrete, New Delhi, India (1959).

Bureau of Indian Standards:IS-1199, Method of Sampling and Analysis of Concrete, New Delhi, India (1959).

Bureau of Indian Standards:IS-383, Specification for Coarse and Fine Aggregates from Natural Sources of Concrete, New Delhi, India (1970).

Deepa Shri. S and D. Prasannan, Strength of Characteristics of Concrete Containing E- Waste, International Journal on Applications in Engineering and Technology 2(5): 20-22 (2016).

Prasannan, D., Prakashraj, D., Ananth, A., Subash D.T. and S. Sundaramoorthy, Study about Mechanical Properties of Fiber Rein forced Concrete. International Journal on Applications in Civil and Environmental Engineering 2(4): 8-11 (2016).

Prasannan, D, Soundharrajan, N., Selvaraj, G., Sathishkumar, E. and A. Suresh, Mechanical Properties of Plastic Fibre Reinforced Concrete. International Journal on Applications in Civil and Environmental Engineering 2(5): 8-11 (2016).