



Behaviour of Concrete by Using Different Soft Drink Tins as Fibre

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Abstract: The experimental investigation represents improving the strength of concrete by using different soft drink tins as fibres. It has been recognized that the addition of small, closely spaced and uniformly dispersed fibres to concrete would act as crack arresters and would substantially improve its static and dynamic properties. In this experimental investigation, soft drink tin strips were used as fibre reinforcement in concrete to produce higher strength of concrete. In total, cubes are 36: if 9 cubes are normal and 27 cubes are fibre reinforcement and 12 nos of cylinders. If 3 cylinders are normal and 9 cylinders are fibre reinforcement. Experimental investigation concrete ratio 1:1.5:3 @ w/c ratio is 0.55 by using as per code IS 456-2000. The cubes were casted using a proportion of fibres 1%, 2%, 3% by weight of cement using 12mm x 25mm long strip respectively. And going to test on compression and split tensile test for 7, 14, 28 days cubes and cylinders.

Keywords: Soft Drink tin Fiber, Fiber Reinforcement Concrete; Compression and split tensile strength.

I. INTRODUCTION

Synthetic and un-synthetic (natural) fibers. Still investigation is underlying to introduce some new and better ones. The fibers can be introduced as reinforcement to increase the mechanical properties of concrete. Fibers interlock and entangle around aggregate particles and considerably reduce the workability, while mixing it becomes more cohesive and less prone to segregation. The additions of fibers make the plain concrete more versatile and more competitive as a construction material. Inclusion of fibers changes the performance of concrete, some fibers have high value of elastic modulus therefore they contribute in improving many of the properties like impact resistance, flexural strength, tensile strength, compressive strength, fatigue resistance, ductility, shear strength and resistance against wear and abrasion. Soft drink tin cut into strips of size 12mmx25mm were used as fibers. The material of tin strip is aluminum. The density of fiber was found to be 1.75g/cm³. Synthetic fibres such as fibres were used in concrete, and into new fibre reinforced concrete continues today. Concrete in general weak in tensile strength and strong in compressive strength. The main aim of concrete technologists is to improve the tensile strength of concrete. To overcome this serious defect partial incorporation of fibres is practised. Great quantities of steel waste fibers are generated from industries related to soft drink bottle. This is

an environmental issue as aluminum waste fibres are difficult to biodegrade and involves processes either to recycle or reuse.

II. MATERIALS

A. Cement

The cement used was ordinary Portland cement 53 (OPC 53). All properties of cement were determined by referring IS 12269 - 1987. The specific gravity of cement is 3.15. The initial and final setting times were found as 30 minutes and 500 minutes respectively. Standard consistency of cement was 32%.

B. Coarse Aggregate

20mm size aggregates - The coarse aggregates with size of 20mm were tested and the specific gravity value of 2.75 and fineness modulus of 7 was found out. Aggregates were available from local sources.

C. Fine Aggregate

The sand which was locally available and passing through 4.75mm IS sieve is used. The specific gravity of fine aggregate was 2.4.



D. Soft Drink TinFiber

The metallic waste such as soft drink tins obtained from various sources. The top and bottom cover of the tin was removed by cutting them by mechanical way. After removal of covers the body tins come in rectangular shape and they were thoroughly washed in clean water and dried properly and with the wire brush they were scratched so that the proper bond between the strip and concrete takes place, then the strips was cut in different sizes as of 12mmx25mm. Soft drink cans aluminam fibre reinforcement concrete and plain concrete are much better compared to theoritical in term of ultimate load.soft drink tins aluminam fibre control the cracking behaviour of the specimens

III.EXPERIMENTAL WORK

A. Compressive Strength

The compressive strength result obtained for 7days , 14 days and 28days it was observed that the compressive strength increased by adding 0%,1%,2%,3% of soft drink tin fibre and it decrease in strength by adding ofsoft drink tinfibre.

TABLE 1

Compressive Strength for Different Proportions

Sl.no	Mix of Soft drink tin Fiber	Avg. Compressive Strength Value N/mm ²		
		7 Days	14 Days	28 Days
1	0%	13.03	18.67	20.07
2	1%	16.6	20.147	22.45
3	2%	15.667	22.07	25.46
4	3%	16.74	22.96	28.35

B. Split Tensile Strength

The Split tensile strength also can be increase by addition of soft drink tin fibre fiber to the concrete.

TABLE 2

Tensile strength for Different Proportions

Sl.no	Mix of Soft drink tin Fiber	Avg. Compressive Strength Value N/mm ²		
		7 Days	14 Days	28 Days
1	0%	13.03	18.67	20.07
2	1%	16.6	20.147	22.45
3	2%	15.667	22.07	25.46
4	3%	16.74	22.96	28.35

IV. CHARTS AND GRAPHS

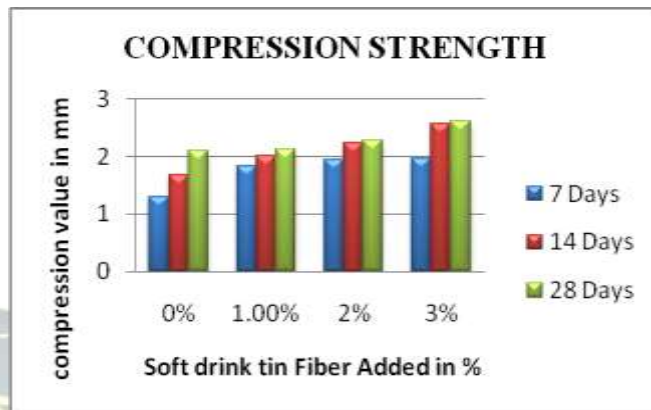


Fig.1 Compressive Strength of Fibre Concrete

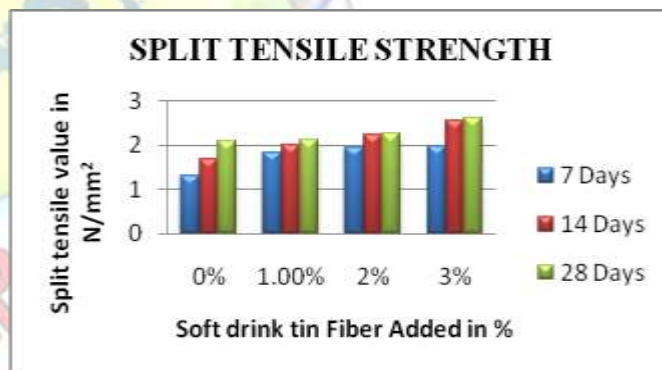


Fig.2 Tensile Strength of Fibre Concrete

V. CONCLUSION

The In this investigate, soft drink tins are in concrete as fiber to make fiber reinforcement concrete. Soft drink tins are the substitute for fiber and added to enhance the mechanical properties of concrete, including workability, compressive strength and density. Soft drink tins fiber is used in different percentages and sizes as 1%, 2%, 3% and 12mmx25mm respectively, to make fiber reinforced concrete. Based on the experimental study conducted and the results presented here, following conclusion can be drawn. Workability of fiber reinforced concrete mixes was decreased gradually with increase in the percentage and size of the fiber over control concrete mix. Workability of 0.5"



size and 3% of the fiber was lower than that of 1% and 2% of the same size, and with the increase in size of fiber from 12mmx25mm and percentage from 1% to 3% it decreases simultaneously. Fiber Reinforced concrete mixes can give better compressive strength than that of control concrete mix at 28 days. With the increase in the percentage and sizes of fiber the compressive strength increases of fiber made concrete mixes over control concrete mix. In general experimental study shows that with the increase in size and percentage of the fiber the workability of fiber reinforced concrete mixes decreases and the compressive strength increased than control concrete mix.

REFERENCES

- [1]. IS 10262:2009, recommended guidelines for concrete mix Design, BIS. NewDelhi, India, 2009.
- [2]. IS 383-1970, Specification for Coarse and Fine Aggregates from natural sources for concrete (Second revision).
- [3]. IS 456 - 2000, Plain and reinforced concrete – Code of practice, Bureau of Indian Standards, New Delhi, 2000, 603-608.
- [4]. C. Neeladharan et.al, “Experimental Investigation on Bendable Concrete by Using Admixtures,” Suraj Punj Journal For Multidisciplinary Research, vol. 8, no. 11, pp 69-78, 2018.
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