

AN EXPERIMENTAL INVESTIGATION OF LATHE STEEL FIBRES REINFORCED WITH M20 CONCRETE

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Abstract: *The main objective of this present research work is to study the properties of concrete, when the concrete is incorporated with steel fibers generated from various operations from the lathes . As we know in lathe shops the wastes are generated in a huge amount in the form of steel fibers .if we manage this steel fibers and use it in most economical way that is if we incorporate it with concrete ,it not only improves the quality of concrete but also reduces the cement content .it improves the workability ,mechanical properties of concrete . in this present research work the steel fibers of diameter 0.6 mm and length 45mm was used with varying percentages of steel fibers of 0%,0.5 % , 1 % ,1.5 % ,2 % ,2.5 % & 3 % by the weight of concrete of M20 grade with water cement ratio 0.42 As per the present research analysis is taken into consideration that these steel fibers increases the compressive ,flexural & split tensile strength .it was also seen that straight steel fibers improved the properties of concrete .The steel fibers which we have taken from lathe and has been observed that optimum dosage of steel fiber 2 % by weight gives the maximum compressive strength ie, 15 % , Split 30% & flexural strength of 42 %*

I. INTRODUCTION

To use these kinds of steel fibers generated from the lathe machines is the great challenging task .if we will not utilize these wastes it will cause pollution ,keeping the environment in view and strategies for solid waste management .by using these wastes ,it not only reduces the pollution but also increases the toughness .The toughness may be defined as the area under load verses deflection curve .it increases the strength of concrete as compared to plain concrete . It decreases the permeability of concrete and also increases the ductility of concrete .These type of concrete can be used where the ordinary concrete fails to withstand .By adding these fibers with concrete it reduces the cement content and indirectly the cost is reduced and makes our project economical on the other hand it not only makes our project economical ,it makes our concrete work durable and strong because adding these fibers with concrete acts as a reinforcement and gives us also alarm before the member collapse ,thus with this property it can be widely used in the construction of Earth Quake resistant building construction .These fibers should be used in limited Quantity excessive use of these will cause adverse effect on the properties of concrete . So proper method should be used while concrete operations should be carried that means proper batching, mixing should be done .The length of the fibers should not be large as it will cause problem in mixing . In this

technological era every where lathe machines are used so these fibers are generated in a large content ,if we will use these waste fibers with concrete it will decrease the cement content ,indirectly we are contributing towards the green environment campaign .The aspect ratio should be kept in mind while selecting the fiber that depends upon the length and the diameter .This type of concrete will not show any problem in compaction by means of vibrators as in the steel reinforcement we have to kept various things in mind will compacting the Concrete

II. MATERIAL USED

CEMENT : ordinary Portland cement of 43 grade of Ultra tech has been used in this work for the experimental purposes as per IS4031-1988.The various properties of cement are given in table 3.5

FINE AGGREGATES: The fine aggregates which used in this experimental work was that type of sand which was that type of sand which was locally available and before that, this sand was used it was firstly sieved in IS sieve 4.75mm & it was used for the preparation of steel fiber reinforced concrete .Total weight of sand was taken 1kg and time of sieving was 15 minutes .The properties of fine aggregates like Fineness Modulus ,Specific Gravity and water absorption are 3.49, 2.90 and 3.47% respectively.

COARSE AGGREGATES: The coarse aggregates which was selected for this experimental work was obtained from local quarry .The maximum size of these coarse aggregates was 20mm.The physical properties of coarse aggregates like fineness modulus and specific gravity are 2.3 & 3.10

STEEL FIBRE: The fibers were collected from the scrap material generated from the lathe .The shape of fibers was straight and deformed and with diameter of 0.6 has been used in the experimental work for the preparation of fiber reinforced concrete .The length of fibers was selected 40mm and density 7850 and with tensile strength 500-300 N/mm²



Fig 1.SCRAP STEEL FIBRE

WATER: - water which was selected for the mixing and curing in the experimental work was free from oils ,acids ,alkali's ,salts and sugar .As per IS code 456-2000 potable water is generally considered for the concreting operations

TESTING OF MATERIALS

The main motive of this is to find the properties of different ingredients which we used for making different specimens for the experimental work .the data we collected for Cement, sand, aggregates And Steel Fibers .These values showed that the right type of material has been used for making Steel fiber Reinforced concrete

TEST ON CEMENT

The Cement which we selected for the experimental; work was OPC Ultratech of grade 43, The specifications as per IS : 8112-1989.it was in good condition .

CONSISTENCY OF CEMENT PASTES:-

Consistency tests for the cement paste with steel fibers were done by vicats apparatus, To observe the changes in water in the pastes due to addition of steel fibers



Fig. 1.1 Vicats Apparatus For Consistency And Initial, Final Setting Time

Normal consistency of steel fibers with cement paste

S.NO	CODE	CONSISTENCY%
1	OPC	31
2	MX(0.5)	32
3	MX(1)	33
4	MX(1.5)	33
5	MX(2)	34
6	MX(2.5)	34
7	MX(3)	34

III. CONCLUSION

Steel Fiber Reinforced Concrete being relatively new construction material & lab. work and field work has clearly shown that the SFRC contains high compressive ,flexural &tensile strength .it can be widely used in place ,where the ordinary concrete fails to work because of its higher strength

and ductility .As for my work investigation is concerned ,the results obtained from my work & by comparing it with other researchers it does not show such variation .The conclusion drawn from this study is presented in this chapter of conclusion

From the Results of the experimental_investigation following are the conclusion

- The experimental investigation shows the properties of M20 reinforced with scrap material (steel fibers) generated from lathe
- The Experimental work also showed that the workability of SFRC gets reduced as we increased the fiber amount
- It also shows that the compressive strength of SFRC gets increased up to 15% with 2% of steel fibers used as compared to plain concrete
- It has been concluded that use of fiber content of 2% by weight of concrete is the optimum dosage

FUTURE SCOPE OF THE STUDY

The present experimental investigation has been carried out to investigate the behavior of SFRC under tension ,Flexure & compression .My guide & Co- Guides namely Er. Mukesh &Er. Sajad Ahmad Mir have suggested that the optimum aspect ratio 80 of fibers & experiments were carried out for the fiber content of 0%,0.5%,1%,1.5%,2%,2 .5% &3% .it has been observed the effect of fiber length ,aspect ratio & the fiber content on the SFRC concrete .More than 3% of fiber content needs future investigation

- Effect of change in fibre length on the compressive , tensile , flexural and other structural properties of SFRC.
- Impact of of aspect ratio of fibres on the behavior of SFRC.
- Effect of fibre contents from 3 to 12 % on the structural behavior of SFRC.

REFERENCES

- [1] Ahsana Fathima K MI & Shibi Varghese "Behavioral study of steel fiber and polypropylene fiber reinforced concrete"(impact IJretvol.2,issue10,oct2014)
- [2] Vasudev r, Dr .B .g vishnuram "studies on steel fiber reinforced concrete, a sustainable approach. "International journal of scientific & engineering research, volume 4, issue 5, may-2013 1941issn 2229-5518 ijser ©2013http://www.ijser.org
- [3] Shende.A.M.I ,Pande .A.M. "Comparative Study on steel fibre Reinforced cum control concrete under flexural and deflection "international journal of applied Engineering Research ,Dindigul volume 1.No .4,2011
- [4] Pooja Shrivastava "reuse of lathe waste steel scrap in concrete pavements "inst journal of Engineering Research & application ISSN:2248-9622 vol 4.issue 12(part 4)Dec.2014,pp45-54
- [5] Ms.Ramadevil ,Ms R. Manju ' Experimental investigation on the properties of concrete with

- plastic PET(bottle) Fibers as fine aggregate
- [6] Thirumurugana & M Sivarajab “ workability & strength properties of hybrid fiber reinforced concrete from industrial waste “ Asian journal of civil engineering (BHRC) vol.14 no 3(2013)
- [7] G-Murali,C.m vivek vardhan ,RP rabu, Z.mohammed sadaquath Ali khan ,T Aarif Mohammed & T. Suresh “ Experimental investigation on fiber Reinforced concrete using waste materials “ISSN : 2248-9622 vol. 2,issue 2 mar-Apr 2012,PP 278-283
- [8] CCANZ Information bulletin IB 39.” Fiber Reinforced concrete”
- [9] G. Vijayakumari ,P Senthilnathan,K Pandurangan & G Ramakrishna .” Impact & Energy Absorption Character tics of lathe scrap reinforced concrete .”ISSN 2319-6009 vol-1 ,Nov2012 IJSCER .