International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 05 | May 2022 www.irjet.net p-ISSN: 2395-0072

"STUDY OF CONCRETE CUBE BY USING LATHE SCRAP AND TREATED WASTE WATER"

Prof.N.S.Pote[1],Ms Shrutika Mukate[2], Ms Mrunal Mane[3] , , Ms Diksha Kolte[4] , Mr. Vaishnav Burhan[5]

[1]Prof. Debt. of Civil Engineering, JSPMs Rajarshi Shahu College of Engineering, Pune, Maharashtra.
[2,3,4,5]Student, Debt. of Civil Engineering, JSPMs Rajarshi Shahu College of Engineering, Pune, Maharashtra, India.

Abstract -

Concrete consists of cement, coarse aggregate, fine aggregate and water. Their proportion in the concrete is fixed depending upon the grade of concrete and it determines the strength also. Currently waste water problem and production of steel waste without management is become a major problem in the construction industry. This paper presents the use of waste water and lathe scrap in concrete for better improvement of the concrete.

The objective of this paper is to study the impact of addition of lathe scrap and the replacement of potable water by the treating waste water in concrete and the compare it with conventional concrete.

The tests conducted are COMPRESSIVE STRENGTH TEST, FLEXURAL STRENGTH TEST and SPLIT TENSIL TEST and experiments are conducted by adding the 2% Lathe Scrap by weight of cement and calculating their strengths at 7 days and 28 days for M20 grade concrete.

All the test results showed an increase in compressive strength as well as flexural strength in early-age at 7 days as well as better results on 28 days when compared to normal M20 grade concrete.

Key Words: **Steel Fibre Reinforced Concrete1**, **Treated waste water2, Lathe scrap3, Universal testing machine4, workability5**,

1. INTRODUCTION

Population of India is rapidly developing continuosly along with construction industry. In the construction, industry there is no option for concrete. The effective use of locally available material is more important in the recent years. There is one material lathe scrap which is easily available. It describes as steel scrap fiber reinforced concrete (SSFRC). The main role of the fibers is to enrich the toughness of the SSFRC under different type of load on concrete. Toughness is called to area under the load vs. deflection curve i.e. fibers problem for increasing population specially in summer season the insufficiency of water is a major problem. At that time we have to study different types of water that means a waste water. Right now we loose million liters of waste water and there is no planning for the use this water rather than discharging in river and the farming. After treating sewage waste water and the testing of waste water in a laboratory if it has similar properties like a potable water then we can use the waste water for the construction purpose. In waste water there is a lot of impurities, bacteria there is a great possibility of killing the bacteria due to heat of hydration. So we can easily use concrete for residential purpose. The benefit of this project is we save millions litter of waste water which we dispose in the river and decreases waste of potable water on a great scale.

2. AIM & OBJECTIVE

1. To look over the use of steel scraps as steel fiber in rigid concrete.
2. To study the effect of lathe scrap on concrete.
3. To compare the properties of tap water and the treated waste water.
4. To look over the Compressive, Flexural and Tensile strength of concrete using lathe scrap and waste water.
5. To propose best suitable water for mixing the concrete.

METHODOLOGY

1. To determine the mix design for M20 grade of concrete.
2. To determine properties of treated waste water.
3. To compare waste water properties with the potable water.
4. Select waste water having properties similar with waste water.
5. To finding out the properties of the lathe scrap
6. To prepare mix design of M20 by using 2% lathe scrap and the treated waste water.

7. Cast a no. of cubes for following combination:
8. CONCRETE(98%)+ LATHE SCRAP (2%)+TREATED WASTE water in the mix design.
9. To cast 6 cubes,6 cylinder and 6 beam.
10. Testing of Concrete cubes on 7th and 28th days for compressive , flexural and the tensile strength.

MATERIAL USED

For M20 grade

1) **Cement**: Portland Pozzolana Cement of the grade 53 is used. The specific gravity of cement is found 3.15g/cm3.fineness 330gm/m2. Initial and final setting time is not to be less than 30 minutes and more than 10 hours respectively.

2) **Coarse Aggregate**: Locally accessible crushed coarse aggregate of 10mm and 20mm in size and angular in shape is used. Fineness modulus and the specific gravity of aggregate are 6.3 and 2.64 respectively.

3) **Fine Aggregate**: Natural river sand which is simply accessible in market which confirms IS:383-1970 zone-II whose size is less than the 4.75mm and of specific gravity is around 2.65 with fineness modulus of 2.75 is used.

4) **Water**: Treated waste water is used in project having properties similar to the potable water like Ph value of water is in between 6.5 to 7.5; recommended by IS code and the BOD value is in between 3 to 5 ppm.

5) **Lathe scrap**: A Lathe scrap is the waste material produced by working on the lathe machine used for shaping metals as reinforced material to increase the properties of conventional concrete.

TEST CONDUCTED

WORKABILITY

Slump cone test is conducted to check the workability of concrete and the concrete reinforced with lathe machine scrap at percentages 2 % by weight the weight of cement. Test is conducted by following the specifications mentioned in Indian Standard [51]

Fig -1: Slump cone Test

COMPRESSIVE STRENGTH

A total of 6 specimens' cubes of concrete were casted having size of 150mmx150mmx150mm for proportions 2% of weight of cement with the waste water and 3 cubes were used for taking average value of 7 days and remaining are tested after 28 days. UTM is used for determining compressive strength.IS 516:1959 is followed while determination the compressive test.

Fig -1: Cube on UTM

TENSILE STRENGTH

6 cylinders specimens were casted for 2% of lathe scrap and waste water of size 150mm dia. and 300mm in height. Split tensile test confirming to Indian Standard code 5816-1959 is used. The tensile strength of concrete reinforced with 2% of Lathe machine scrap by weight in concrete was determined.

Fig -3:Tensile strength on UTM

CONCLUSIONS

IRJET sample template format ,Conclusion content comes here. Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here Conclusion content comes here . Conclusion content comes here

FLEXURAL STRENGTH

In flexural strength test of beam, the specimen of size 700mmx150mmx150mm was placed over single point loading arrangements and stress produced during break down of specimen is determined. This breaking stress is called as Modulus of rupture or flexural strength. The test is done by following Indian Standard code set by 516-1959. The flexural strength of beams reinforced with the lathe scrap , 2% by weight of cement is determined. Figure shows the beam specimen taking flexural strength.

Fig -3: Flexural test on UTM

LITERATURE REVIEW

In the "Domestic waste water reuse in concrete using bench scale testing and full scale implementation" [1] paper ,the author used treated domestic waste water in concrete. He used primary treated waste water, secondary treated waste water and distilled water were used to cast the concrete specimen. And he concluded that compressive strength of the concrete produced with distilled water and secondary treated waste water is having less compressive strength and reduced by up to 16.2%.

In the "Sustainable use of resources – Recycling of sewage treatment plant water in concrete" [2] paper, the author used treated waste water obtained from the sewage treatment plant and he concluded that as a sustainability approach the preliminary research findings shows that significant differences do not exist between mortar cubes made of portable water versus sewage treated waste water. In the "Use of treated waste water for concrete mixing in Kuwait" [3] paper, the author clearly explained about the type of water used for mixing do not affect to concrete slump and density And he also considered use of water in mixing concrete and studied the properties.

In the paper "utilization of waste water to check strength parameters of concrete" [4] the author reviews possibility of replacing fresh water with the waste water and he concluded that workability of the concrete goes on decreases with the increase in percentage of waste water and compressive

strength of the concrete is slightly increased with the increase in percentage of treated waste water in concrete.

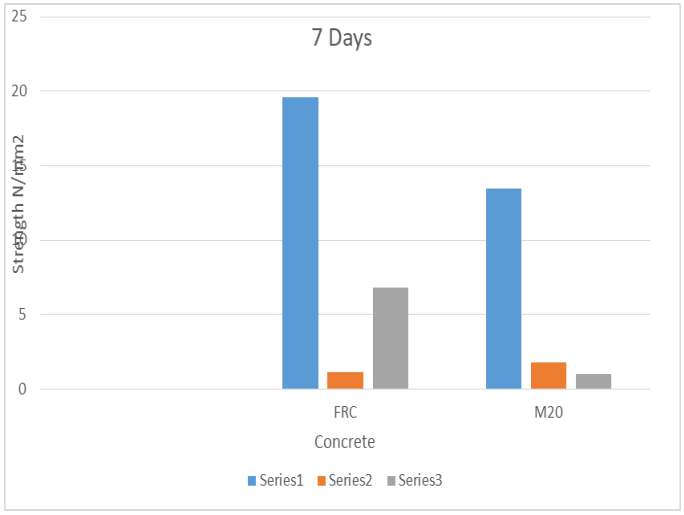
In the paper" Strengthening of concrete using lathe scrap waste" [5] the author concluded that the addition of lathe waste remarkably increases the strength of concrete .Since concrete is weak in tension it is seen that the tensile strength of concrete also shows astonishing patterns.

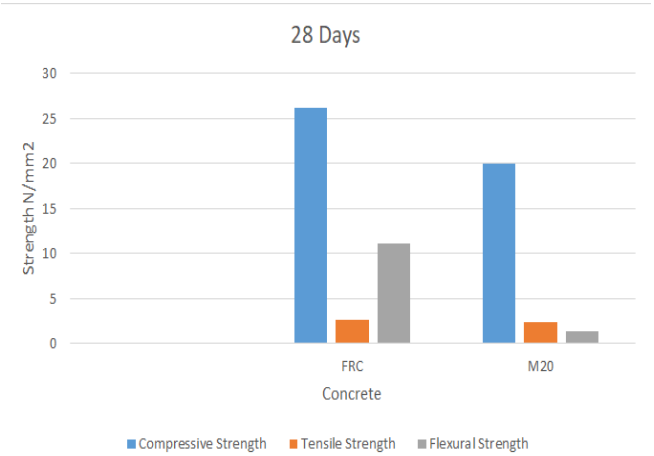
SCOPE OF PROJECT

Water scarcity is the global problem , by using waste treated water we can overcome it in the some proportion. Generally treated waste water from sewage treatment plant is released in the local water bodies which may pollute water sources and harmful to the aquatic animals or plants. That's why we can easily use it in the construction industry instead of potable water. Lathe scrap is the waste of steel industry.

RESULT AND CONCLUSION

Column1	7 Days	Column2	Column3
	Compressive Strength	Tensile Strength	Flexural Strength
FRC(7DAYS)	19.63	1.17	6.816
M20(7DAYS)	13.5	1.8	1
FRC(28DAYS)	26.229	2.65	11.044
M20(28DAYS)	20	2.34	1.3





1. By using lathe scrap compressive strength and flexural strength increases by 2-4%.

2. Concrete prepared by using treated waste water and potable water gives almost same results.

REFERENCES

1. Ayoup M. Ghrair , Othman Al-Mashaqbeh "Domestic waste water reuse in concrete using bench scale testing and full scale implementation"

2. Marcia Silva and Tarun R. Naik, "Sustainable Use of Resources – Recycling of Sewage Treatment

3. Plant Water in Concrete" the university of Wisconsin Milwaukee center for By-products utilization second international conference on sustainable construction matarials and technologies june 28- june 30, 2010.

4. Ibrahim Al-Ghusain,Mohammad J.Terro."Use of treated waste water for concrete mixing in Kuwait"

5. "Utilization of waste water to check strength parameters of concrete"

6. Mohd Amir Sheikh,Masoom Reza"Strengthening of concrete using lathe scrap waste"

7. Sheetal Chinnu James et al., 2nd International Conference on Science, Technology and Management, University of Delhi, 27 September 2015.

8. Poorva Haldkar, International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 Index Copernicus Value (2013): 6.14 | Impact Factor (2015): 6.391

9. Prof. Kumaran M., International Journal of Research in Advent Technology (E-ISSN: 2321- 9637) Special Issue International Conference on Technological Advancements in Structures an

10. Dr. John O. Kakonge (2002) Water scarcity and related environmental problems in parts of sub-Saharan Africa: the role of the transboundary Environmental Impact Assessment Convention, Impact Assessment and Project Appraisal, 20:1, 49-59, DOI: 10.3152/147154602781766861 Neville AM (1994) "Properties of concrete", 4th edition, Longman scientific & Technical, Essex, U.K.

11. M S Shetty "Concrete Technology", S Chand & Company Ltd., 2012, 25th edition.

12. UNEP, World Water Assessment Programme (WWAP), Global Environment Outlook: Environment for Development (GEO-4), Human Development Report 2006, World Business Council For Sustainable Development (WBCSD), Food and Agriculture Organization of the United Nations, Sweden.

13. IS 516: 1959- Methods of Tests for Strength of Concrete, Bureau of Indian Standards, New Delhi.

14. IS 383: 1970-Specification for Coarse and fine aggregates from natural resources for concrete, Bureau of Indian Standards, New Delhi.

15. IS 10262:2009, Indian Standard Concrete mix proportioning – Guidelines (First Revision), Bureau of Indian Standards, New Delhi, India.

16. IS 2386 (Part I-VIII)-1960, Indian Standards methods of testing of Concrete (First Revision), Bureau of Indian Standards, New Delhi, India.

17. IS-10262-2009 Code Book.

18. IS-456-2000 Code Book

BIOGRAPHIES

Ms. SHRUTIKA MUKATE
Studying Final Year of B.E.-Civil at JSPM's Rajarshi Shahu College of Engineering Pune
Maharashtra,Pune

Ms. MRUNAL MANE
Studying Final Year of B.E.-Civil at JSPM's Rajarshi Shahu College of Engineering Pune
Maharashtra,Pune

Mr. VAISHNAV BURHAN
Studying Final Year of B.E.-Civil at JSPM's Rajarshi Shahu College of Engineering Pune
Maharashtra,Pune

Ms. DIKSHA KOLTE
Studying Final Year of B.E.-Civil at JSPM's Rajarshi Shahu College of Engineering Pune
Maharashtra,Pune