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A Study on Socio Economic Analysis of Addition of Lathe Scrap in Concrete

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Abstract- For development of any region,infrastructure is important role player.concrete is the main constituent of civil engineering structures .concrete have various properties but it lacks in providing tensile strength.The main objective of this investigation is to study the effect of addition of lathe scrap in concrete on the cost of structure and its environmental impact . It is expected that the use of lathe scrap in concrete improves strength properties of the concrete. Different strength tests and their related results helped in concluding that lathe scrap can be used as good fiber addition material in concrete and it also reduces the cost by decreasing the amount of steel bar .
Key words:concrete,lathe scrap,steel bar,cost

I. INTRODUCTION

Infrastructure plays an important role for the development of any area. Concrete is a main constituent of the Civil Engineering structures for the infrastructure development. Concrete is one of the widely used construction material in the world after water.Concrete has various properties such as ability to be molded into any desired shape, easy availability of the constituent materials used, and many other advantages which make the concrete as a very popular construction material. Other than advantages, concrete have some deficiencies such as low tensile strength and low ductility i.e. concrete is weak in tension. Although the long continuous steel bars are provided in concrete and which are quite effective in providing the tensile strength to the concrete. But these bars fail to stop the development of micro cracks in concrete. In order to overcome the deficiencies, various researches has been carried out by adding the different kind of fibers to concrete to improve the strength properties of concrete and to decrease the development of micro cracks. Wastes are generated in large quantity from every steel industry. When the steel scrap is introduced in the concrete it acquires the term: Fibre Reinforced Concrete (FRC) and using a particular lathe machine waste i.e. lathe scraps in concrete it acquires the name as Lathe Scrap fibre Reinforced Concrete (LSFRC).
The main objective is to find out the socio-economic analysis of using lathe scrap in concrete used for commercial purpose

II. REVIEW OF LITERATURE

Various studies have shown that lathe scrap can be a good fibre addition material.concrete does not provide tensile strength to structure ,so steel bars are provided .in order to reduce the cost of structure ,lathe scrap can be added .
There are many researches carried out by various researchers in the field of using lathe scrap in concrete and are discussed below:- Shirulepravinashok, Irwanliekeng Wong [conducted a “Study of utilization of waste lathe scrap on increasing compressive strength and tensile strength of concrete” and In this research, he have mixed the lathe waste in three proportions, i.e. 0.5, 1 and 2%. The results show that the compressive strength increased by 16.4% and tensile strength increased by 25.3% by 2% as compared to plain cement concrete.

III. MATERIALS USED AND METHEDOLOGY

Cement,sand,coarse aggregiate ,Lathe scrap,Cubes,
The experimental investigation of work was done in step by step as follows:

1. Weighing: All the materials i.e. Cement, Sand, lathe scrap and Water was weighed using weighing machine available in the laboratory according to the mix design ratio calculated.
2. Mixing: The mixing of all the materials was done manually using hand mixing process as shown in fig. The equipments used for mixing was trowel and spade

Fig.Moulds

3. Preparation of Moulds: The cubes of dimension 150mm each was used for filling as shown the concrete mixture.
4. Compaction: The compaction of the cubes was done by using vibratory testing machine available in the laboratory as shown in Fig. 7. The striking by trowel was also done for final finishing and proper compaction.. The cubical moulds were properly cleaned, tightened and oiled before the filling of material.
5. Curing: The cubes were kept for 24 hrs and after that demoulding of cube was done and marked for future identification while testing. The cubes were kept in water tank for 7 and 28 days of curing respectively for different specimens.
6. Testing: The cubes were taken out of water tank after 7 and 28 days for performing the compression strength test . For each specimen three samples were casted and the mean value was noted up for final results.

IV. ECONOMIC ANALYSIS

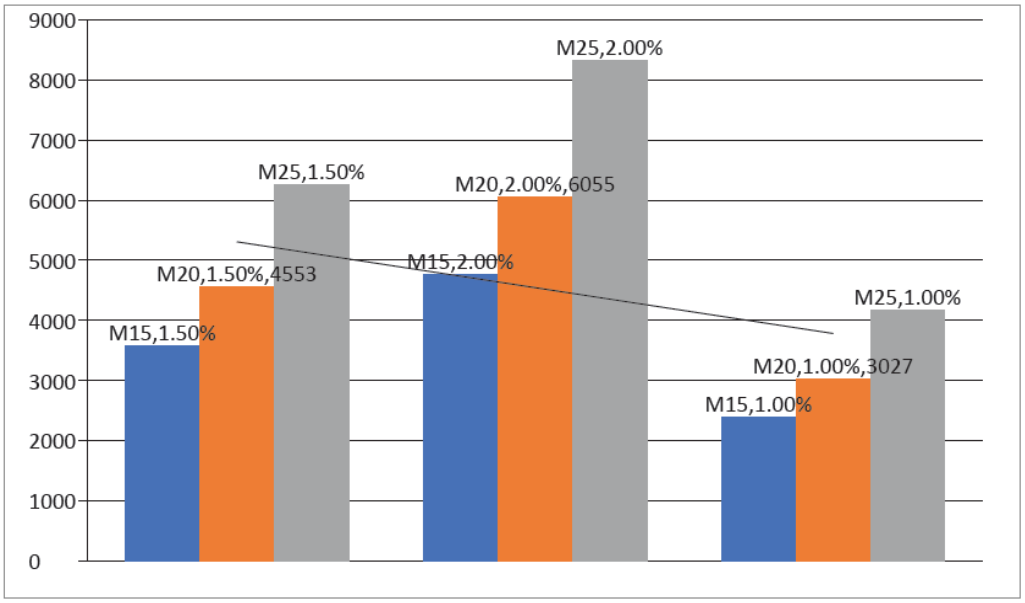
Assumption:It is required to make slab of 100 ft *100 ft *6 inch .
By using 1%,1.5% and 2% lathe scrap addition in concrete ,steel bars consumption decreases by a significant amount .this results in economic benefit .

V. CALCULATION

- Volume of concrete slab =30.5*30.5*.1524=141.7 cum
- Factor of safety =1.5 (IS code)
- For M20 grade concrete ,
- Amount of cement in 141.7 cum of concrete=141.7*1.5/5.5=38.64 m^3 1m^3 cement=1440 kg
- So,total amount of cement required=55641 kg
- Amount of lathe scrap added=1.5% of 38.64m^3=.58m^3
- Density of lathe scrap=7850kg/m^3
- So amount of lathe scrap=4553 kg

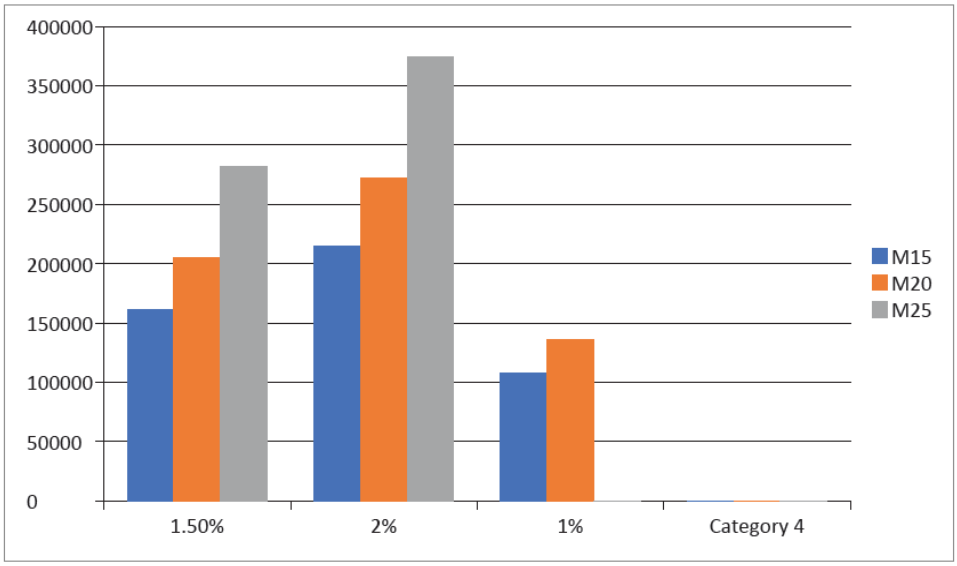
- For nominal reinforced cement concrete (RCC) 1.5% Steel is used So steel bars required =.015*141.7*7850=16685 kg
- By using of lathe scrap ,amount of steel bars saved =4553 kg Similarly,amount of steel reduction is calculated for M15 and M25 grade.

VI. RESULT



COST ANALYSIS
Cost of steel bar=RS45/kg
Money saved in rupee

VII. ENVIRONMENTAL BENIFITS



Dumping of this steel industrial waste is great problem to environment and creates hazardious situation .So it is necessary to take proper steps for dumping of such waste .For that reason,use of industrial waste as replacing material to any of the constituent or an addition as fibre can be done to improve strength of concrete and prevent the environment degradation .

Wastes are generated in large quantity from every steel industry .steel lathe industries generates waste in form of steel scraps obtained from lathe machines in process of finishing and shaping of different steel parts and products .

VIII. CONCLUSION

It is found that the lathe scrap being the steel industry waste is a good material as a fibre to be used in the concrete to enhance the strength of the concrete. After going through all the study of the research papers and literature review it has been seen that mainly researchers worked on compressive strength and split tensile strength of concrete on different concrete mix at different proportions of lathe scrap. From the above discussion, it is concluded that the lathe scrap casn be used to increase Compressive strength & Flexural strength as well as it becomes quite economical by saving the amount of steel bars consumption .From above result it can be concluded that 2% addition of scrap to M20 grade is most benifitial in term of cost and strength.

Apart from these benefits it also helps to conserve environment by consuming industrial waste and reducing the quantity of lathe scrap generated from steel industries.

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