iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 3 **Issue:** X **Month of publication:** October 2015

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Behavior of E Waste Plastics in Concrete

Manikandan.P[1], Senthamilkumar.S[2]
[1]Ph.D Scholar, [2]Professor , civil engineering
Periyar Maniammai University,Vallam

Abstract-Generation of waste materials are create the most ecological problems for the environment. Especially the electronic waste materials are the harmful and toxic waste materials compare to other solid waste. To rectify those environmental problems by reuse of E waste in some other methods. If using this e waste materials in construction wise the cost of cement, concrete manufacturing and cost of construction materials will reduce. It will reduce the value of landfill cost, saving energy and it will protect the environment from the solid waste pollutions and its effects indirectly. E waste consist a waste of TV, Refrigerator, radio,AC,broken laptops and some electronic wastage. An experimental study utilization of e waste materials or particles additionally in concrete with a percentage of 0% to 20% at the strength criteria M25 grade of concrete. Following that the chemical properties like chloride and sulphate testing also be conduct for this study. Finally this study gives the environmental aspects for the E wastes and basic mechanical properties and chemical behavior of conventional and e waste concrete for M25 grade.

Key Words: E Waste, Chloride, Sulphate, Mechanical properties

I. INTRODUCTION

Generation of waste materials is the most ecological problems for the environment. Because the usage of electronic products are increasing day by day in domestic and industrial wise. In tamilnadu per day 5000 tones, E wastes are generated each cities 20 to 25 tones. Most of that broken computers and TV's. Each year 800000 tones of E waste are generated in India and sale of computers, laptops and other electronic products grown 18% in last year. It estimates the rate of E products is doubled in every year. So the wastes are disposed in the method of landfill and burning of E wastes. It will cause and pollute the environment and this wastes are produced today is remain in the environment hundreds and perhaps thousands of years. One solution to this crisis lies in recycling wastes into useful products and wastes are re-used in construction wise. This paper seeks the utilization and behavior of E wastes in concrete. From that E waste are additionally added to the concrete 0% to 20% and size of these waste 10 to 12.5mm.This study describes the mechanical properties and chemical behaviors of E waste concrete. Following that for mechanical properties the cubes and cylinders are cured for 14 and 28days. For chemical behavior tests each specimen are cured for 105 days by using chemicals of chloride and sulphate separately. Finally the e waste concrete results are compared with the conventional concrete.

II. LITERATURE REVIEW

Similar to this study to many researches has done before itself. From the literature reviews Ankit Arora and Dr.Urmil.V.Dave has suggested the strength of the concrete slightly reduced in case of grinded E waste was used as a replacement of Fine Aggregate and the strength varies with the size of the particle of the waste added to the mortar cubes. Making of tiles with white cement and crushed E waste were 20% cheaper than the vitrified tiles same dimensions.

Lakshmi.R, Nagan.S suggested the E waste is not suitable to replace of fine aggregate it is used to replace the coarse aggregate. Strength of the concrete decreased when the E plastic content was more than 20%.

P.Gomathi Nagajothi, Dr.T.Felixkala. In her report suggested the compressive strength of the concrete is increased with the addition of E fiber waste constantly and E fiber waste concrete with 2.5% addition has achieved a characteristic compressive strength nearly twice that of the conventional concrete after 28 days curing.

III. MATERIAL PROPERTIES

A. Cement

43 grade of ordinary Portland cement was used in this experimental study work as per IS 12269-1987.

Specific gravity of cement – 3.46

©IJRASET 2015: All Rights are Reserved

Initial setting time – 36min
Fineness of cement – 8%

B. Fine Aggregate
Size of the fine aggregate was less 4.75mm in IS sieve
Specific gravity – 2.38

C. Coarse Aggregate
Size of the coarse aggregate was greater than 4.75mm in IS sieve
Specific gravity – 2.7

D. Water
Water is an important gradient of concrete and the pH value of water used in concrete shall not be less than 6.

E. E Waste
Broken pieces of TV, Refrigerator and etc and size of E waste 10mm to 12.5mm
Specific gravity of E waste -

IV. EXPERIMENTAL INVESTIGATION

A. Test Programme
This projects deals with the behavior of E waste in concrete. To find out the strength parameters such as compressive strength, tensile strength, chloride testing, sulphate testing and corrosion of concrete with the additional added of E waste as a coarse aggregate is the prime concern of the study.

B. Details Of Specimen
1) Cube Specimens: A mould of internal dimension 150 X 150 X 150 mm are using for casting of cubes for compressive strength, chloride and sulphate testing for both conventional and E waste concrete.
2) Cylinder Specimens: A mould of internal dimension 150 mm diameter in 300 mm height are used for casting the cylinder for split tensile strength, chloride and sulphate testing for both conventional and E waste concrete.

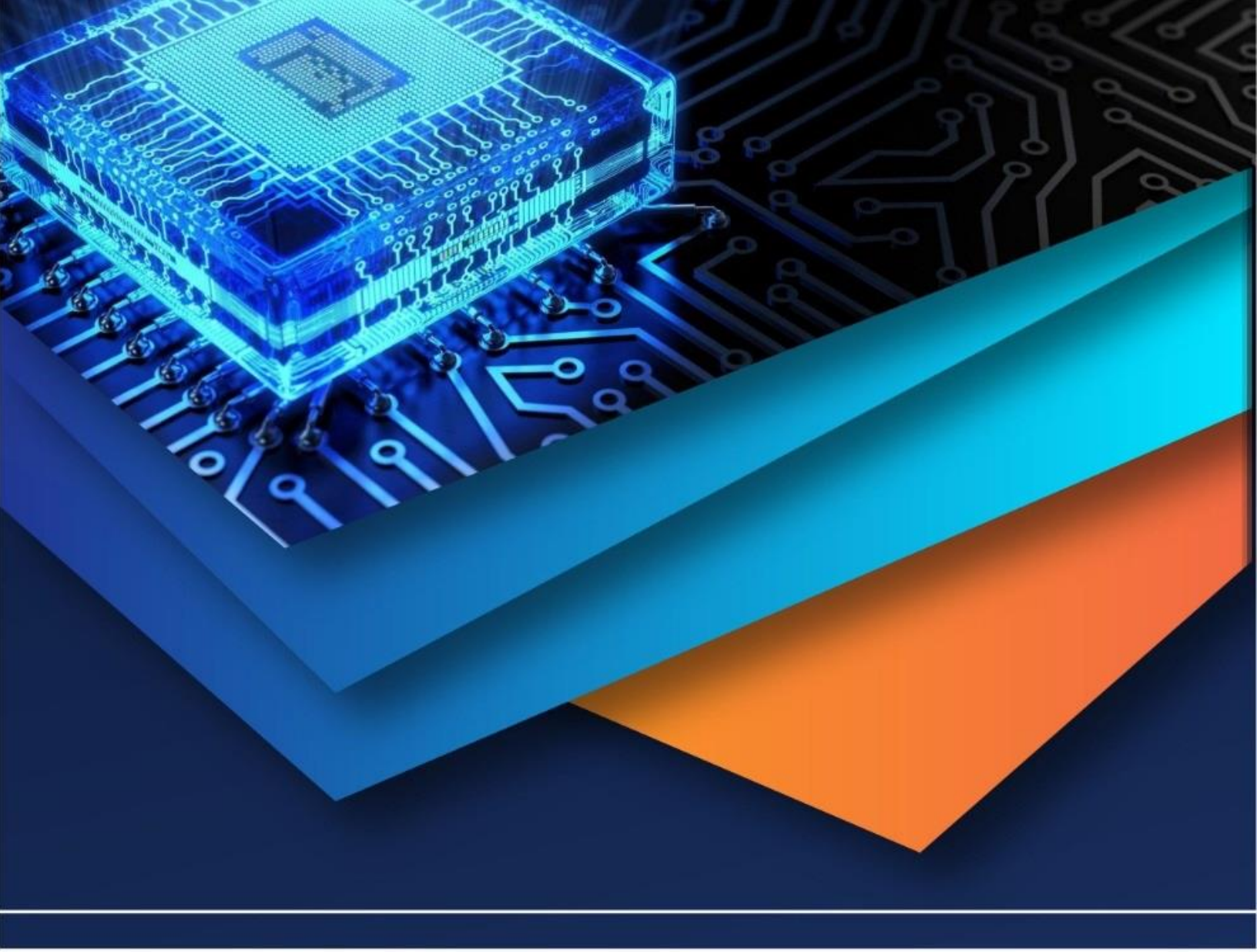
V. RESULT AND CONCLUSION

The chemical behavior and mechanical properties of E waste concrete is to be done at the curing period of 7 days, 28 days and 105 days.

REFERENCES

[1] R.Lakshmi, S. Nagan, “Utilization of waste E plastic particles in cementitious mixtures” Journal of Structural Engineering,Vol.38, No. 1, April – May 2011, pp. 26-35.
[2] P.M.Subramanian, “Plastic recycling and waste Management in the US” Resources,Conservation and Recycling vol (28) pp 253263.
[3] R.Lakshmi, S. Nagan (2011) , “Investigations On Durability Characteristics Of E-plastic Waste Incorporated Concrete” Asian Journal Of Civil Engineering (Building And Housing) Vol. 12, No. 6 (2011) Pages 773-787
[4] Amiya Akram, C. Sasidhar, K. Mehraj Pasha “E-Waste Management by Utilization of E-Plastics in Concrete Mixture as Coarse Aggregate Replacement” Vol. 4, Issue 7, July 2015
[5] R. Kandasamy and R. Murugesan(2011), “ Fibre Reinforced Concrete Using Domestic Waste Plastics As Fibres” ARPN Journal of Engineering and Applied Sciences , VOL. 6, NO. 3, MARCH 2011
[6] Iftekar gull, M. Balasubramanian, K.S.anandh, K.vetrivel “An experimental investigation on use of post consumed e- plastic waste in concrete” Vol.2., Issue.2., 2014

©IJRASET 2015: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)