

REUSE OF HOSPITAL PLASTIC WASTE IN CONCRETE AS A PARTIAL REPLACEMENT OF COARSE AGGREGATE: AN OVERVIEW

Ashutosh Kumar¹, Mukesh Pandey²

¹PG Scholar, Department of Civil Engineering, ITM University Gwalior – 474001, M.P.

² Professor & Head, Department of Civil Engineering, ITM University Gwalior – 474001, M.P.

Abstract - Concrete is a most common material for human being to use in construction. Now this study, the performance of the hospital plastic as aggregate in concrete has been studied on compressive strength weight decrease and workability. Also the impact resistance of concrete contains plastic aggregate has been carried out deeply in this study. Hospital plastic waste one of the waste plastic type, is used in this study. Reason to choose the hospital plastic waste to develop a novel technique to handover it to respected invention and to explain the difficult of removal the loads of plastic waste. The natural a series of four concrete mixes were prepared with replacement ratio of plastic aggregate 0%, 10%, 15% and 20% by volume of natural aggregate. Also the same ratio used by adding plastic waste without replacing aggregate in the impact resistance test. The results of experiment show the feasibility to use hospital plastic in real mixes. The workability of the new concrete was create to decrease with increasing plastic contented. From the results obtained he stood revealed that the compressive power of the material also decrease appreciably by growth now the plastic satisfied. The workability of a fresh concrete both for the control and concrete with plastic aggregate were determine using the slump cone test. Cube of the model remained used to control the compressive strength check of tough concrete.

Key Words: Compressive strength, Plastic aggregate, Flexural strength, Concrete, Test

1. INTRODUCTION

Concrete stands the maximum broadly cast-off structure considerable in the creation. There is an alarm to more accepting then toward recover his things. Consuming unused then reprocessed ingredients now existing mixes attractive progressively main near succeed besides luxury both the solid unwanted produced through manufacturing plus municipal discarded. Plastic is unique of the record important improvements of 20th period compacted. The quantity of plastic used yearly has been increasing progressively and develops a thoughtful eco-friendly problematic. Aimed at answering the removal of big volume of recycled plastic material, use of plastic in concrete business is careful as possible proposal. Concrete volume covers from 60–85% aggregate then it productions a large part trendy material effects such for example workability, power, dimensional strength, and stability, therefore the usage of excess ingredients now material as collections can result in the quantity of unwanted materials totally. Unimportant collective stands an essential solid now falling the part heaviness of material. An effort has previously

remained complete scheduled the usage of flexible unwanted as polyethylene terephthalate flask such as unimportant collection.

An analysis happening the usage of flexible excess fashionable homework of adhesive plaster and actual training is now open, bodily and automatic assets aimed at the request of material modified with plastic were calculated Records about using plastic as aggregate were provided only for some of properties, several important properties such by means of effect struggle, durability, disappointment features, thermo-physical goods, toughness show of cement pointing and concrete covering plastic as total need more study.

This study aims at examining the effect of recycled plastic in concrete as course 2 aggregates in the impact resistance, through a better considerate the behavior of Used plastic in concrete constructions, testing new and tough concrete. Combination having used plastic

2. LITERATURE REVIEW

Plastic aggregates recycled in many studies from Different sources like hospital clinic and waste material. Some studies are following.

Al-Manasseh and Dalai, (1997) in this work researcher is find the effect of plastic aggregate to use the concrete in plastic content. In this purpose they prepared 12 cubes of dimension also take 150×150 mm with water cement ratio varying percentage (0%, 10%, 30% and 50%) of plastic collection. He is used maximum 13 mm size of plastic aggregate. They find the results are (I) Bulk density of mixture reduced with gain in plastic substance so bulk density is low in conventional concrete. (ii) To reducing the bulk density was direct matching to the plastic collection. (iii) Density of material is reducing by 2.5%, 6% and 13% respectively 10%, 30% and 50% so these are reducing the density was property to the low unit weight of the plastic.

Choi et al. (2005) in this research work author is considered the impact of PET that mean Polyethylene terephthalate. In this study author is focused the PET bottles in this work. He take the water cement ratio varying 45%, 49% & 50% the exchanging ratio 0%, 25%, 50% & 75% take in this assignment. By capacity of fine aggregate. Density of material combination reduced with growth the lightweight substance. This assignment the impression of PET bottles lightweight collection on the splitting tensile strength of material was observed. Mix sizes of material were designed. The w/c they

examined that (i) splitting tensile strength of material mixes lower by 19%, 31% & 54% with gain in PET collection by 25%, 50% & 75% separately and (ii) splitting tensile strength may be increasing to reduce down the water cement ratio. Similarly this research inspected the results of PET bottles lightweight collection on the modulus of elasticity of material mixes reduced with the growth in plastic collection.

Marzouk et al. (2007) in this study the bulk density of cement plaster mixing ready by exchanging 0-100% in capacity of sand by two different sizes of plastic collection. This examined presented that the lessening of bulk density continued minor when the size unavailable by collection differs among 0% & 30% irrespective of their size. But when this size overdone 50% the compound bulk density happening to fall pending getting a value 1000kg/m³. They similarly create that for the similar volumetric proportion of exchanging the bulk density reduced with reducing substance size.

Ismail and Al-Hashmi, (2008) in this study the opinion of consuming many plastic wastes. Covering almost 80 percentage polyethylene and 20 percentage polystyrene for example fine collection up to 4.75 mm in material. Through growing the plastic cast-off satisfied. The compressive examination presented the trend for compressive force principles of plastic unwanted material to reduction under the involved in material on every curing time. 10% of plastic waste with concrete. Shown the lowermost compressive force at 28 days curing time around 30 percentage minor immediately that of the mention concrete mix. Similarly the study establish 5%, 7% & 8.7% lower thickness of concrete mix covering 10%, 15% & 20% plastic collection separately.

Albano et al. (2009) in this study include concrete with 10% of reused plastic waste show a compressive force that happen the average strength ideals for concrete with medium strength in the middle of 21 & 30 MPa aimed at curing time of 28 days. They testified that the compressive force at the stage of 28 days is close the standards for 60 days. Each issues were occupied in attention such by way of the kind of disappointment and the creation of honeycombs, small workability, element size which are answerable for minor compressive force of concrete covering plastic collection than concrete covering ordinary collection. The decrease in compressive force was additionally in concrete covering greater crumbling plastic collection than minor one.

Frigione (2010) establishes minor values of splitting tensile strength in material covering plastic collection ready consuming great water/cement value than in parallel mix ready at little w/c value. Through exchanging 5% by weight of fine collection (natural sand) per an equal mass of plastic collection man-made from the unwanted plastic bottles. Example with dissimilar cement contented and water cement relation were man-made.

3. CONCLUSIONS

[1] This review attentions on study of the plastic aggregate. The investigators have characterized the individual type uses of plastic aggregate in concrete.

[2] Researchers proposed the exchanging of many concrete elements with suitable plastic aggregate. Their suggestions were founded on effects achieved from investigation of various casted concrete samples.

[3] The major attention of compressive strength of concrete covering plastic and very less focus was other properties of material.

[4] All the researchers used the classic concrete parts with plastic waste and no focus was given to admixtures and other properties.

[5] The area of research on use of plastic aggregate in concrete has no information of hospital plastic waste in concrete mixes.

[6] There are many literature work are successfully run by plastic aggregate in concrete so these are major sources to utilize the plastic waste on a forms of plastic aggregate .

REFERENCES

- [1] Al-Manaseer.A.A., Dalal.T.R. 1997. Concrete containing plastic concrete aggregate. *Concrete International* 19(8), 47-52.
- [2] Albano C., Camacho N., Hernandez M., Mathews A., Gutierrez A., "Influence of content and particle size of waste pet bottles on concrete behavior at different w/cRatios". *Waste Management* 29 (2009), 2707-2716.
- [3] Choi, Y.W., Moon, D.J., Chung, J.S., Cho, S.K., "Effects of waste PET bottles aggregate on the properties of concrete", *Cement and Concrete Research* 35, 2005, 776-781.
- [4] Frigione M., "Recycling of PET bottles as fine aggregate in concrete", *Waste Management* 30 (2010), 1101-1106.
- [5] Ismail Z.Z., AL-Hashmi E.A., "Use of waste plastic in concrete mixture as Aggregate replacement", *Waste Management* 28 (2008) 2041-2047.
- [6] Marzouk O.Y., Dheilily R.M., Queneudec M., "Valorisation of post-consumer plastic waste in cementitious concrete composites", *Waste Management* 27 (2007).
- [7] Shah, S.S.A and Khan, R. (2016) Re-Use of Hospital Plastic Waste in Asphalt Mixes as Partial Replacement of Coarse Aggregate. *Open Journal of Civil Engineering*, 6,381-387. <http://dx.doi.org/10.4236/ojce.2016.63032>.