Experimental Investigation on Strength of Light Weight Concrete Using Plastic Waste – A Review

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***Abstract*: In recent days, the use of different types of plastic has been increased because of the rise in industrialization and other behaviors of human beings. It produces substantial. Garbage is very unhealthy every day. A safe and balanced reuse of plastic have a variety of benefits. The suitability of plastics that are recycled as course. Aggregate in concrete in concrete by performing different tests such as workability by slump test, cube and cylinder compressive power, splitting tensile strength test Cylinder, to assess concrete characteristics and actions, Impact of Coarse aggregate replacement with different quantities (0 percent to 40 percent) of Plastic. The sum of concrete behavior was experimentally investigated and the optimum was optimized. It has been found to substitute coarse aggregate**

***Keywords*: Strength of Light, Weight Concrete, Plastic Waste.**

1. Introduction

- The production and use of plastic has been observed all over the world recently. Plastic waste poses a serious environmental threat.
- If it is deposited in a landfill or some other location, the soil drainage system can be blocked. Mosquito breeding grounds and other water may be responsible for the blocked drains.
- Plastic waste decreases the rate of water percolation and often worsens soil fertility. Moreover, water and marine life are polluted by plastic waste dumped into rivers, lakes, seas and other aquatic bodies. Owing to its toxicity, the health of marine animals that ingest plastic waste can be significantly affected.
- Due to its economic and environmental benefits, the reuse of plastic waste in the manufacture of cement concrete can be a good option for the disposal of plastic waste.
- Usage of plastic waste such as a container of polyethylene terephthalate (PET), high density polyethylene (HDPE) used in concrete as aggregate.
- An experimental study shows that the introduction of PET aggregates enhances the durability behavior of the concrete concrete resulting from.

2. Literature Review

1. *Experimental investigation on strength of light weight concrete using plastic waste (February 2018)*: The research has shown that the replacement of plastic waste with coarse aggregate had a strong effect on the strength of concrete. The current unit weight of concrete samples with plastic waste was decreased by 4 percent relative to control samples. More precisely, the compressive strengths were found to be lower than the control strengths of concrete samples containing plastic waste. It is noted that concrete specimens having plastic waste were lower than the control group. On the observation, we can say that polyethylene terephthalate plastic exhibits substantially more compressive strength than high density polyethylene plastic.
2. *Experimental investigation on strength of light weight concrete using plastic waste (November 2016):* The density of concrete is minimum when plastic content is maximum .Because the water tightness capacity of a plastic is more compared to natural aggregate this helps in finding out micro cracks. The problems like landfilling environment problems can be decreased by using the recycled plastic waste in concrete. This method of substitution of aggregates is useful when aggregates are in crisis.
3. *Durability of light-weight concrete with plastic Waste (August 2015):* The research was carried out to explore the possibility of manufacturing plastic aggregate and using plastic aggregate as a replacement for natural coarse concrete aggregate. The goal of the present work is to research the strength and workability of concrete with partial replacement by plastic aggregate of natural aggregate.
4. *Journal of application in engineering (March 2019):* Based on the test results, Concrete produced by replacing natural aggregate by recycled coarse aggregate with addition of 1% of waste plastic. Fibers by weight of cement exhibits higher compressive and split tensile strengths. The can be conclude that using of plastic waste as a replacement of natural coarse aggregate does not have any adverse impact on the strength of the concrete.

3. Objectives

The main objective of our experiment are as below.

- To find Coarse Aggregate, Fine Aggregates and Cement properties
- To find the physical properties of Waste Plastics.

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- Finding the physical features of waste plastics.
- Finding out the content of the Optimal Modifier (OMC).
- To cast both cement concrete cubes and cylinders under fatigue loading, both simple and modified.
- To find out the optimum compressive, workability, split tensile strength and the freshly prepared concrete's flexural strength.
- Seeking the perfect replacement of natural aggregate with plastic aggregate.
- Benefits of the substituted plastic aggregate over the concrete's actual aggregate.

4. Methodology

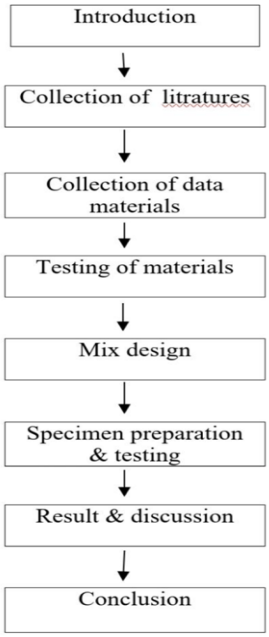

Fig. 1. Methodology

5. Inference

This paper examines the effort of a manufactured plastic aggregate on the fresh, hardened and microstructure properties of light weight concrete. The manufactured plastic aggregate was used as replacement for volcanic light weight aggregate between 25% and 100% on a volumetric basis, at intervals of 25% .Depending upon the forming agent the work of light weight concrete is determined.

6. Conclusion

- Fine aggregate cannot be substituted by plastic material, but only coarse aggregates are used. It is also concluded that the use of plastic can improve the concrete's tensile strength. The use of plastic can enhance the concrete's properties, and can serve as one of the methods of plastic disposal.
- Case studies based on studies, experimental work and research papers have shown that PET waste can be used for concrete modifications. Concrete with waste PET bottle fiber can not only be used as an efficient method for plastic waste management, but also as a strategy for the potential development of more economical and sustainable building materials.

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