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Implementation of Plastic Waste in Manufacturing of Paving Blocks for Different Shapes

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ABSTRACT

Block Paving is a commonly used decorative method of creating a pavement or hard standing. The main benefit of Paving Blocks Over other materials is that it can later be replaced. Also from Asthetic point of view, Pavers are good. Paving Blocks are generally used for Pedestrian, Parking, etc. Different types of manufacturing methods are now carried out to use some non-degrade able material. Plastic Waste is increasing day by day which pollutes the environment. So, it is very much important to implement these waste material such that it can be used for different purposes like recycling and reusing. The disposal of waste plastics (PET, PP, etc.) is a biggest challenge, as repeated recycling of PET bottles poses a potential danger of being transformed to a carcinogenic material and only a small proportion of PET bottles are being recycled. Because of costly conventional recycling techniques, there has been an increased demand for more scientific and innovative technologies to effectively recycle these materials. But it is not completely possible to reuse and recycle those waste again and again due to danger of cancer. In this project we will use plastic waste in the manufacturing of paving blocks for different shapes and compare their strengths.

KEYWORD: *Poly ethylene teryphthalate (PET), PolyPropylene (PP), conventional recycling techniques*

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INTRODUCTION

Plastic is a very useful substance in our daily life work, but after the use of plastic it is very difficult for us to dispose of it because it is a non-biodegradable substance. After its usage it is a hazardous material. The properties of plastic are very unique and it can mix with every kind of material. Plastic is a composition of synthetic and semi synthetic organic compounds. They are malleable and ductile and remold into any solid substance. Plastic is used in various objects which we use in our daily life like polythene, plastic cups, furniture, bags, packaging of food and other accessories, drinking containers, bottles, frames, basins etc. We need to use better advance techniques and methods to dispose plastic waste properly, otherwise, the time is not too far away where we see it as a big challenge for us to dispose it. Researchers suggest that if plastic isn't disposed of soon, it can sustain for 4500 years without degradation. Now, these days the rate of plastic use keeps increasing. So the collection of plastic waste is increasing at a rapid speed. The usage of plastic can't be banned, but we can reuse it in many ways. Plastic can be reused in various sectors like marketing, manufacturing, transportation etc. In construction sector, we can use the plastic waste on a very large scale after recycling it, which means the problem of plastic waste can be removed for a long time period. It seems to be more practicable and efficient method to solve this problem.

AIM AND OBJECTIVE

Aim: To Implement the Plastic Waste which is harmful for environment/Ecological imbalance by using them in manufacturing of paving blocks.

Objective:

- To learn about new waste management techniques, which will help in reducing the harmful substances present in the environment.
- To develop an alternative material which could satisfy requirements of good material.
- To reduce the consumption of natural resources.
- Develop appropriate environmental assessment, implementation and monitoring activities related to different waste collection methodologies and the respective benefits to improve current waste management practices.

LITERATURE SURVEY

I. Influence of non-metals recycled from waste printed circuit boards on flexural properties and fracture behaviour of polypropylene composites, Yanhong Zheng, Zhigang Shen

It has been done the work to describes Flexural strength and flexural modulus of the composites can be successfully improved by filling nonmetals recycled from waste printed circuit boards (PCBs) into polypropylene (PP). By using scanning electron microscopy (SEM), the influence of

nonmetals on fracture behavior of PP composites is evaluated by in situ flexural test.

II. Use of recycle plastic bag waste in the concrete, Youcef Ghernouti et al.

The study present the partial replacement of fine aggregate in concrete by using plastic fine aggregate obtained from the crushing of waste plastic bags. Plastic bags waste was heated followed by cooling of liquid waste which was then cooled and crushed to obtained plastic sand having fineness modulus of 4.7. Fine aggregate in the mix proportion of concrete was replaced with plastic bag waste sand at 10%, 20%, 30% and 40% whereas other concrete materials remain same for all four mixes. In fresh properties of concrete it was observed from the results of slump test that with increase of waste content workability of concrete increases which is favorable for concrete because plastic cannot absorb water therefore excessive water is available.

III. Use of plastic in a concrete to improve its properties, Raghatate Atul M

The paper is based on experimental results of concrete sample casted with use of plastic bags pieces to study the compressive and split tensile strength. He used concrete mix by using Ordinary Portland Cement, Natural River sand as fine aggregate and crushed granite stones as coarse aggregate, portable water free from impurities and containing varying percentage of waste plastic bags (0%, 0.2%, 0.4%, 0.6% 0.8% and 1.0%).

IV. innovative technique of waste plastic use in concrete mixture, Pramod S. Patil.et al

This study presents the use of plastic recycled aggregate as replacement of coarse aggregate for production of concrete. They used forty eight specimen and six beams/cylinders casted from variable plastic percentages (0, 10, 20, 30, 40 and 50%) used as replacement of coarse aggregate in concrete mixes. They have conducted various tests and observed decrease in density of concrete with increase percentage of replacement of aggregate with recycle plastic concrete. They also reported decrease in compressive strength for 7 and 28 days with increase in percentage of replacement of coarse aggregate with recycle plastic aggregate. They have recommended feasibility of replacing 20 % will satisfy the permissible limits of strength. Again these researchers limited their research to only compressive strength property and no work was carried out to study the other important properties of concrete. Their research also lacks use of various admixtures in concrete to cater for the loss in strength.

V. Study of Strength Property of Concrete Using Waste Plasticsand Steel Fibers, Khilesh Sarwe.[2014]

This study presents the results of addition of waste plastics along with steel fibers with an objective to seek maximum use of waste plastic in concrete. Two different categories of mix were casted in cubes (150mm x 150mm x 150mm), one with varying percentages of plastic wastes (0.2%, 0.4%, 0.6%, 0.8% and 1% weight of cement) and another mix of plastics waste/steel fibers (0.2/0.1, 0.4/0.2, 0.6/0.3, 0.8/0.4 and 1/0.5 % by weight of cement) to study the compressive strength at 7 and 28 days strength. The combine mix of plastic waste and steel fibers has shown more strength as compare to concrete mix prep only with plastic waste. He has reached to conclusion that a plastic waste of 0.6% weight of cement when used with steel fiber of 0.3 % (weight of cement) has shown the maximum compressive strength.

CONCLUSION

1. From the above literature, it is seen that the research are in interest of different forms of plastic waste which can be use in production of concrete. They proposed the replacement of various concrete ingredients with suitable plastic waste material.
2. Their proposals were based on results obtained from experimentation of various casted concrete samples. The enhanced strength can be safely attributed to pozzolanic action of the pulverized PCB waste. Reduction in flexural strength needs further investigations.
3. The workability of the concrete with pulverized PCB did not show appreciable changes as compared to the control mix. The PCB waste can be utilized in concrete making and hence solve a potential disposal problem. Based on above literature work we reached to a conclusion that Plastic waste can be successfully use in concrete.
4. Reduction in density and compressive strength was reported by all researchers. The strength development pattern of E-waste concrete is similar to that of conventional concrete but there is decrease in strength at all the curing ages to increase compressive strength.
5. So it is concluded that E-waste are the potential viable material can be used as fine aggregate to produce durable concrete. The use of fine aggregate in concrete will help in alleviating the potential problem of dwindling natural resources.

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