

EXPERIMENTAL STUDY ON REUSE OF PLASTIC WASTE IN PAVER BLOCK

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Abstract - The aim of this project it's to replace cement with plastic waste in paver blocks and to reduce the cost of Paver blocks. When compared to that of convention Concrete Paver block. at present nearly 56 lakh tones of plastic waste is produced in India per year the degradation rate of plastic waste is also a very slow process hence this project is useful in reducing plastic waste in a useful way in this project we have used a plastic waste in different proportions with Quarry dust coarse aggregate and ceramic waste. The Paver blocks where prepared and tested and the results were discussed.

Key Words: Paver blocks, Plastic Waste, Ceramic Waste

1. INTRODUCTION

Paver block paving is versatile, aesthetically attractive functional and cost-effective and requires little or no maintenance is correctly manufactured and lead most concrete block paving constructed in India also performed satisfactorily but to main area of concern or occasional sell your due to excessive surface wear and variability in the strength of blocks natural resources are depleting worldwide at the same time The generated waste from the industry and residential area are increasing the Stanley the sustainable development of construction involves the use of non-conventional and innovative materials and recycling of waste material in order to compensate the lack of natural resources and to find alternative ways conserving the Plastic waste used in this work was brought from the surrounding area currently about 5600000 ton of plastic waste dumping in India in a year the dump the wasteful of the surrounding environment as the result it affects both human beings and animals in direct and indirect way since it is necessary to dispose the plastic with properly as per the regulation provided by our government.

1.1 Plastic wastes

Reduce, Reuse and Recycle of plastics are essential to make environment greener and safer.

1.2 Types of plastics

Plastic materials include as follows,

- 1) Polypropylene (PP)
- 2) Polystyrene (PS)
- 3) High impact polystyrene (HIPS)
- 4) Acrylonitrile butadiene styrene (ABS)
- 5) Polyethylene terephthalate (PET)
- 6) Polyester (PES)
- 7) Polyamides (PA)
- 8) Poly (vinyl chloride) (PVC)

1.3 Factors affecting recycling of plastics

Recycling and re-utilization of waste plastics have several advantages. Recycling and re-utilization of waste plastics lead to a reduction of the use of virgin materials and of the use of energy, thus also a reduction of carbon dioxide emissions. Economically, in some cases, plastics recycling may be profitable. However, a number of factors can complicate the practice of plastics recycling, such as the collection of the plastics waste, separation of different types of plastics, cleaning of the waste and possible pollution of the plastics. A further complicating factor is the low-value nature of most of the products that can be manufactured from recycled plastics. Reusing plastic is preferable to recycling as it uses less energy and fewer resources.

OBJECTIVE OF PROJECT

1. To utilized the Industrial Waste Material.
2. To reduce waste disposal problems of industries.
3. To reduce the CO2 emission while producing Portland cement.
4. To minimize the utilization of natural resources material.

LITERATURE SURVEY

B. Shanmugavalli, Assistant Professor, (2017): Discuss that, the following conclusions were drawn from the experimental investigation. The utilization of waste plastic in production of paver block has productive way of disposal of plastic

waste. The cost of paver block is reduced when compared to that of concrete paver block. Paver block made using plastic waste, quarry dust, coarse aggregate and ceramic waste have shown better result. It also shows good heat resistance. Though the compressive strength is low when compared to the concrete paver block it can be used in gardens, pedestrian path and cycle way etc. It can be used in Non-traffic and light traffic road.

F. Pacheco Torgala, Yining Dingb (2012): Discuss that, Tire rubber and PET wastes represent a serious environmental issue that needs to be addressed with urgency by the scientific community. Investigations carried out so far reveal that tire waste concrete is specially recommended for concrete structures located in areas of severe earthquake risk and also for applications submitted to severe dynamic actions like railway sleepers. This material can also be used for non-load-bearing purposes such as noise reduction barriers. Investigations about rubber waste concrete show that concrete. Performance is dependent on the waste aggregates. Further investigations are needed to clarify for instance which are the characteristics that maximize concrete performance. As to PET based concrete the investigations show that this material is very dependent on these wastes. At present PET bras are already used to replace steel bras and some author's even report the use of PET concrete mixtures for repairing concrete structures submitted to high underwater erosion. Nevertheless, future investigations should clarify which treatments can maximize concrete performance being responsible for the lowest environmental impact. Further investigations should also be carried on about the use of other polymeric wastes in concrete.

PROPERTIES OF PLASTIC

Plastic waste used in making paver block was collected from the surrounding locality LDPE is indicated by resin number 4. It includes plastic bags. The plastic bag used is of about 50 microns.

The basic properties are provided below.

PROPERTIES OF LDPE

S. N.	Particulars	value
1	Melting point	150°
2	Thermal co-efficient of expansion	100-200X10-6
3	Density	0.910-0.940
4	Tensile strength	0.20-0.40 (N/mm ²)

PROPERTIES OF FINE SAND

In the present investigation fine aggregate is natural sand from local market is used. The properties of fine aggregate like specific gravity, bulk density, gradation and fineness modulus are tested in accordance with IS 2386.

The basic properties are provided below.

PROPERTIES OF FINE SAND

SN	Description	Value
1	Specific gravity	2.479
2	Grading zone	Zone II of soil
3	Fineness modulus	2.952
4	Water absorption	1.80

Methodology

Plastic wastes are heated in a metal bucket at a temp of above 150°. As a result of heating the plastic waste melt. The materials quarry dust, aggregate and other materials as described in previous chapter are added to it in right proportion at molten state of plastic and well mixed. The metal mould is cleaned through at using waste cloth. Now this mixture is transferred to the mould. It will be in hot condition and compact it well to reduce internal pores present in it. Then the blocks are allowed to dry for 24 hours so that they harden. After drying the paver block is removed from the moulds and ready for the use.

2. COMPRESSIVE STRENGTH

Compression Strength Result For Block Type 1

Proportion Name	Plastic Waste	Sand	Coarse Agreegate	Compressive Stress(N/Sq.m)
PPB-1	1kg	1.4kg	0.700kg	4.76
PPB-2	1kg	1.4kg	0.700kg	5.35
PPB-3	1kg	1.4kg	0.700kg	5.82
				Avg =5.31

Compression Strength Result For Block Type 2

Proportion Name	Plastic Waste	Sand	Coarse Agreegate	Ceramic waste	Compressive Stress(N/Sq.m)
PPB-1	2kg	1.4kg	0.700kg	0.700kg	9.45
PPB-2	2kg	1.4kg	0.700kg	0.700kg	9.67
PPB-3	2kg	1.4kg	0.700kg	0.700kg	10.15
					Avg =9.75

Compression Strength Result For Block Type 3

Proportion Name	Plastic Waste	Sand	Coarse Aggregate	Ceramic waste	Compressive Stress(N/Sq.m)
PPB-1	3kg	1.4kg	0.700kg	0.75kg	12.62
PPB-2	3kg	1.4kg	0.700kg	0.75kg	13.50
PPB-3	3kg	1.4kg	0.700kg	0.75kg	13.24
					Avg =13.12

CONCLUSIONS

1. The utilization of waste plastic in production of paver block has productive way of disposal of plastic waste.
2. The cost of paver block is reduced when compared to that of concrete paver block.
3. Paver block made using plastic waste, quarry dust, coarse aggregate and ceramic waste have shown better result.

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