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## EXPERIMENTAL STUDY ON REUSE OF PLASTIC WASTE IN PAVER BLOCK

Hinge R. D., Chavhan T.B., Sonkamble S.B., Yewale P.S., Shirure P.A., Patel T.V., Tongse S.P.

Civil Department, G. H. Raison Academy of Engineering & Technology, Nagpur, Maharashtra, India

rahul.hinge@raisoni.net

chavhantanvi13@gmail.com

**ABSTRACT:** This paper researches that the performance is to replace cement with plastic waste in paver block and to reduce the cost of paver block when compared to that of convention concrete paver blocks. There are 3 type of total 24 paver block of size 200X100X100 mm. The degradation rate of plastic waste is also a very slow process. Hence the project is helpful in reducing plastic waste in a useful way. In this project we have used plastic waste in different proportions with sand, coarse aggregate and ceramic waste. The paver blocks were prepared and tested and the results were discussed.

**Key words:** Plastic Waste, Sand, Ceramic Waste, Compressive strength.

### I. INTRODUCTION

Paver block paving is versatile, aesthetically attractive, functional, and cost effective and requires little or no maintenance if correctly manufactured and laid. Most concrete block paving constructed in India also has performed satisfactorily. The use of Nonconventional and innovative materials, and recycling of waste materials in order to compensate the lack of natural resources and to find alternative ways conserving the environment.

We made three types of paver blocks using various ingredient mix proportion ratio as like sand, ceramic waste, coarse aggregate. We had done 24 sample of plastic paver block. It is very easy to use survival for pedestrians. It also shows good heat resistance compared to the concert paver block. It can be used in gardens, pedestrian paths and cycle way etc. The main aim of the project is to use plastic waste instead of cement. Already government has banned on plastic but we also tried to remove remaining available plastic on our surrounding area because of it is badly affected on human beings and animals life directly or indirect way.

### I. METHODS AND MATERIAL

#### 1. Proportion of materials:

##### 1.1 Plastic Waste:

Plastic waste is used in making paver blocks was collected from surrounding areas. It include plastic bottles, plastic bags. The plastic bag is used is of about 50 micron. The plastic is melted on 160°.

##### 1.2. Sand:

Sand is used is less than 4.75 MM in making plastic paver block. Also we take the physical properties on sand and it's compared to IS code value.

**Table1.** Properties of sand

SN	Description	Value	IS Value
1	Specific Gravity	2.49	2.65
2	Fineness Modulus	2.95	3.2
3	Water Absorption	0.65%	0.65%

### 1.3. Coarse Aggregate:

Locally available coarse aggregates were used in this work. Aggregates passing through 12mm sieve and retained on 10mm sieve were sieved and tested as per Indian standard specification IS: 383-1970

**1.4. Ceramic Waste:**  
The principle waste coming from the ceramic industry is the ceramic waste. The disposal of these waste require large area. It is very difficult to find a use of ceramic waste produced.

### 2.1. Mix Proportion:

Block type1- Three paver blocks were casted using mix ratio provided below

Plastic waste = 3kg

Sand = 1.4kg

Aggregate= 1.4kg

Block type 2 - Three paver blocks were casted using mix ratio provided below

Plastic waste = 3kg

Sand = 1.4kg

Aggregate = 0.700kg

Ceramic waste = 0.700kg

Block type 3 - Three paver blocks were casted using mix ratio provided below

Plastic waste=3kg

Sand = 1.7kg

### 2.2. Preparation of Test Specimens:

In this project, plastic are heated in metal bucket at a temperature of 160°.when the plastic is Melted properly well and came in liquid form then mix the one by one ingredient in melted plastic liquid and mixed it well. Then the prepared mould is cleaned and then the mix proportion is transferred in mould. After transferring mixture it shake properly that's why reducing the internal pores present in it then it properly settled. 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.



**Fig1.** Heating and Adding



**Fig2.** Casting and Drying

### 2.3. Testing of Specimens:

Compressive strength for paver blocks Plastic paver blocks of size 200X100X100mm was casted. The maximum load at failure reading was taken and the average compressive strength is calculated using the following equation.

$$\text{Compressive strength (N/mm}^2\text{)} = (\text{Ultimate load in N} / \text{Area of cross section (mm}^2\text{)})$$



**Fig 3.** Compression Test Machine

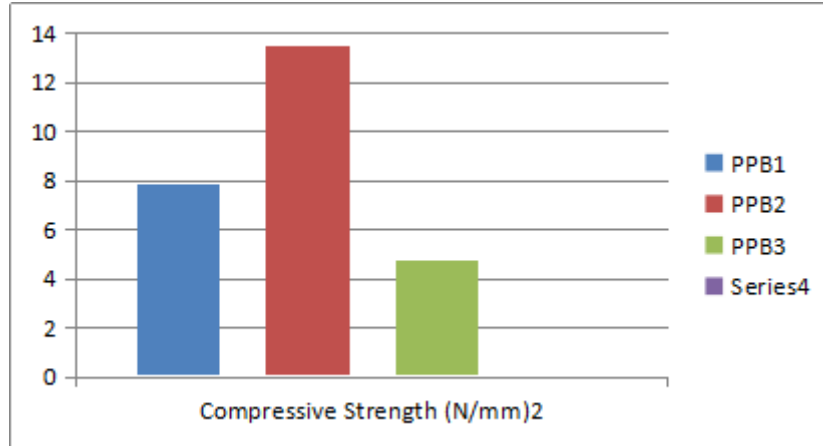
### 2.4. Oven test:

As the paver block is made of plastic we need to know its melting point hence oven test is performed. The paver block is kept in oven for 2 hours in oven and after 2 hours its condition is verified.

## II. RESULT AND DISCUSSION

**Table2.** Compressive Strength

Proportion Name	Plastic	Coarse Aggregate	Sand	Ceramic Waste	Compressive Strength (N/mm) <sup>2</sup>
PPB1	3kg	1.4kg	1.4kg	-	7.85
PPB2	3kg	0.700kg	1.4kg	0.700kg	13.50
PPB3	3kg	-	1.7kg	-	4.76



**Fig. 4** Compressive Strength of Different Specimen

**Table3.** Oven test result

Specimen	Temperature(0C)	Remark
PPB1	100	No Change
PPB2	100	No Change
PPB3	100	No Change

### III. CONCLUSION

The following conclusions were drawn from the experimental investigation:

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.

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