PRODUCTION OF PLASTIC PAVER BLOCK FROM THE PLASTIC BOTTLE (COARSE AGGREGATE & SAND)

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Abstract This paper researches to replace cement with plastic waste in paver block and to reduce the cost of paver block as well as utilizing waste plastic bottle in manufacturing of paver blocks as compared to that of convention concrete paver blocks. The project aims in reducing plastic waste in a useful way and reduce pollution from environment also making paver block economical. Three type of total nine paver block of size 200 x 100 x 75 mm were prepared for the experiment. In this project we have used plastic waste in different proportions with sand and coarse aggregate. The paver blocks were prepared and tested and results obtained for compressive strength, water absorption were found better, as compared

Index Terms- Plastic Waste, Sand, 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 done 24 sample of plastic paver block.

It is very easy to use survival for predistrians.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.

II.METHODS AND MATERIAL

Proportion of materials:

Plastic Waste:

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

Sand:

Sand, from canan river; used is less than 4.75 MM in making plastic paver block. Also we takes the physical properties on sand and its 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%

Coarse Aggregate:

Locally available coarse aggregates were used in this work. Aggregates passing through 10mm sieve and retained on 6mm sieve were sieved and tested as per Indian standard specification IS: 383-1970

i. **Mix Proportion:**

Block type1- Three paver blocks were casted using mix ratio provided below
Plastic waste = 1 kg
Sand = 1 kg
Aggregate= 1 kg
Block type 2 - Three paver blocks were casted using mix ratio provided below
Plastic waste = 1 kg
Sand = 1.5 kg
Aggregate = 1.5 kg
Block type 3 - Three paver blocks were casted using mix ratio provided below
Plastic waste=1 kg
Sand = 2 kg
Aggregate = 2 kg

ii. **Preparation of Test Specimens:**

In this project, plastic bottles are heated in metal bucket at a temperature of 160˚. When the plastic is melted properly and came in liquid form then we mixed the ingredients one by one in the melted hot plastic and mixed and tamped them well to prepare a homogenous mix. Then the prepared mould is cleaned and the mix is transferred in mould. After transferring the mix in mould, it was vibrated properly so as to remove air bubble and level the mix properly. Then the blocks were allowed to dry for 5 hours so that they get hardened. After drying the paver block were removed from the moulds and were ready for the test. On a similar way two more proportion of plastic waste were taken and mixed, to prepare moulds with different properties. Three paver blocks of each type were casted thus total nine paver blocks were casted.

- **Testing of Specimens:**

Compressive strength test for all three types of paver blocks of size ***200 x 100 x 75 mm*** was done. The maximum load at failure reading was taken and the average compressive strength is calculated using the following equation.

Compressive strength (N/mm2) = (Ultimate load in N / Area of cross section (mm2))

III. RESULT AND DISCUSSION

Table 1.Compressive Strength

Proportion Name	Plastic (Kg)	Coarse Aggregate (Kg)	Sand (Kg)	Compressive Strength (N/mm)2
PPB1	1	1	1	28.48
PPB2	1	1.5	1.5	20.02
PPB3	1	2	2	10.85

Oven test:

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

Table 3.Oven test result

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

IV. CONCLUSION

From the above study, the analysis concluded that

- The waste plastics can be used in the paver block production.
- Plastic is an innovative material for using it in construction purpose.
- Plastic paver blocks possess more advantages which includes resource efficiency.
- The utilization of waste plastic in production of paver block has productive way of disposal of plastic waste
- Compressive strength of plastic paver block is found to be 10.43% more than concrete paver block for ratio 1:1.5:1.5.
- It can be used in non-traffic and light traffic road, gardens, pedestrian path etc.
- It requires less time for manufacture.
- By using the plastics in paver block, reduces the weight up to 15%

- Water absorption through of plastic paver block is less than concrete paver block, hence proper drainage system will be required to take care of runoff.

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