

REPLACEMENT OF CEMENT BY RECYCLED PLASTIC WASTE IN PAVER BLOCKS

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Abstract : The purpose of this project is to replace cement with plastic waste in paver blocks and to limit the price of paver blocks when compared to that of conventional concrete paver blocks. As we are observing that the natural assets are depleting international at the equal time generated waste from the industry, residential and family in increasing day with the aid of day. At existing almost fifty six lakhs tones of plastic waste is produced in India per year. The degradation rate of plastic waste is also a very gradual process. The sustainable improvement for building entails the use of non- traditional and modern materials, and recycling of waste materials in order to compensate the lack of herbal resources and to discover the alternative methods conserving the environment. The concrete for paver block which is made up with the aid of including plastic in concrete assist to minimize plastic bags and also reduce the value of paver blocks.

Keywords – Paver block, Plastic waste, Reuse,

I. INTRODUCTION

Paver blocks paving is versatile, aesthetically attractive, practical and cost effective and requires little or no renovation if efficiently manufactured and laid. Use of paver block is now a days turning into popular, they are used for paving of approaches, paths and parking area. Concrete paver blocks are made with concrete if truth be told consisting of cement, Fine aggregates, Coarse Aggregates (10mm & below), Water, Chemical pigments for colouring and Appearance reason etc. Overall overall performance of concrete paver block used are by way of and giant ruled by residences of materials, water cement ratio, mixing manner and curing process.

As we are looking at that the herbal assets are depleting world extensive at the identical time the generated wastes from the industry, residential and family is increasing day by day. The sustainable development for construction includes the use of non-conventional and revolutionary substances and recycling of waste materials in order to compensate the lack of natural assets and to find choice ways conserving the environment. The giant issue of waste is plastic which consist of polyethylene, which include polypropylene, polyethelene, terephthalate and polystyrene. Plastic waste is a huge risk to the environment.in 2005 after monsoon rains flooded Mumbai. Plastic baggage have been blamed for clogging the underground drainage system and intensifying the effect of the floods.

Even two India's cows, think about sacred have no longer been spared.After 3,000 cows died in Lucknow in 2000, the city investigated and determined plastic luggage in their belly with more than 35 heaps of plastic waste generated by each Indian state, every day India is confronted with the massive query of how to get rid of this non- degradable menace.Plastic waste used in this work is added from the surrounding areas currently about fifty six lakhs tonnes of plastic waste dumped in India in a year. The dumped waste pollutes the surrounding environment. As the end result it influences each human beings and animals direct and indirect ways. Hence it vital to dispose the plastic waste exact as per the regulations furnished through our government.

The degradation charge of plastic waste is also a very slow process. Hence the project is beneficial in lowering plastic waste in a useful way. In this project we have used plastic waste in the distinct proportions with first-rate aggregate. The paver block is casted and tested and additionally compared the strength with conventional paver blocks.

II. MATERIAL USED

2.1 Plastic Waste:

Plastic waste used in making paver block used to be amassed from the surrounding locality in consists of the plastic bags. The plastic bag used is of about 50 microns (LDPE) two Low Density Poly Ethene.

Diversity of plastics functions is related with their particular properties, low density, easy processing, excellent mechanical properties, appropriate chemical resistance, superb thermal and electrical insulating homes and low price (in assessment to different materials).

WASTE PLASTIC	AVAILABLE AS
Poly-ethylene terephthalate (PET)	Drinking water bottles etc
Low Density Polyethylene (LDPE)	Milk pouches, sacks, carry bags, bin linings, cosmetics and detergent bottles.

2.2 Sand :

Natural river sand was used as a fine aggregate. The residences of sand have been determined through conducting checks as per IS: 2386 (Part-1). The results are proven in take a look at records of materials. The outcomes got from sieve analysis are furnished. The effects indicate that the sand conforms to region 11 of IS: 383-1970.

Properties of Sand

SR.NO	TESTS	RESULT
1	Specific Gravity	2.6
2	Bulk Density	1690 kg/m ³
3	Fineness Modulus	2.92

2.3 Coarse Aggregate:

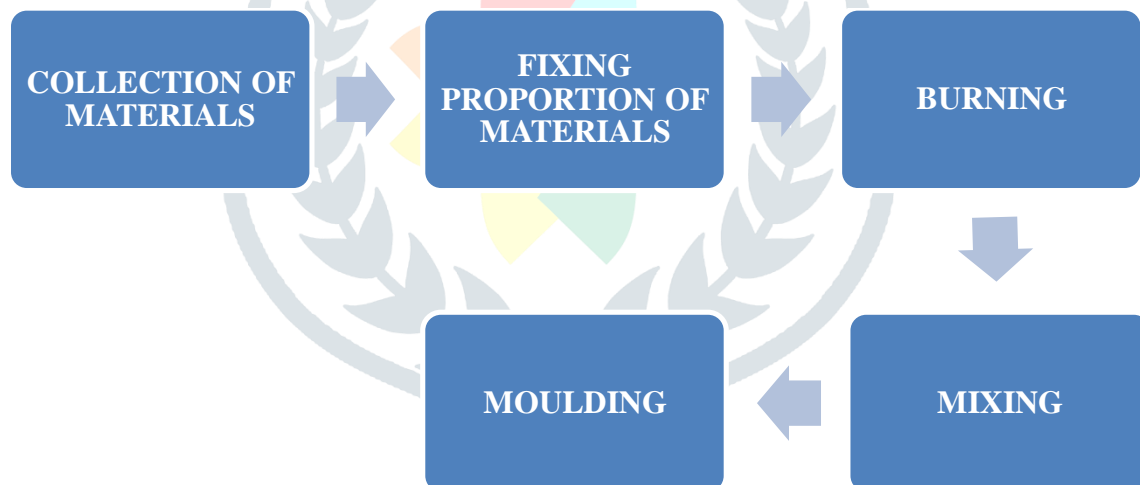
Locally on hand coarse aggregates were used in this work. Aggregates passing via 12mm sieve and retained on 10mm sieve were sieved and examined as per Indian popular specs IS: 383-1970.

2.4 Foundry Waste Sand

Casting of mechanical parts is executed in foundries. The mold of sea sand is formed and molten metals are poured in it. After cooling the steel get harden and require part is adopted. Sand used as mould is acknowledged as foundry sand this foundry sand cannot be used in addition and disposal of this turns into big problem. Thus reuse it for construction is higher option.

Waste foundry Sand consist primary of, uniformly sized, excessive fine silica sand or lake sand that is bounded to structure molds for ferrous (iron and steel) and non-ferrous (copper, aluminum, brass).

III. Methodology :



IV. PREPARATION OF SPECIMEN :

Plastic wastes are heated in a metal bucket at a temp of above 150°. As a end result of heating the plastic waste melt. The substances , mixture and different materials as described as comply with are introduced to it in proper proportion at molten kingdom of plastic and well mixed. The metallic mould is cleaned thru at the use of waste cloth. Now this mixture is transferred to the mould. It will be in hot condition and compact it properly to minimize inner pores current in it. Then the blocks are allowed to dry for 24 hours so that they harden. After drying the paver block is eliminated from the moulds and prepared for the use.

**V. ACTUAL MIX DESIGN OF PLASTIC SAND BRICKS:-**

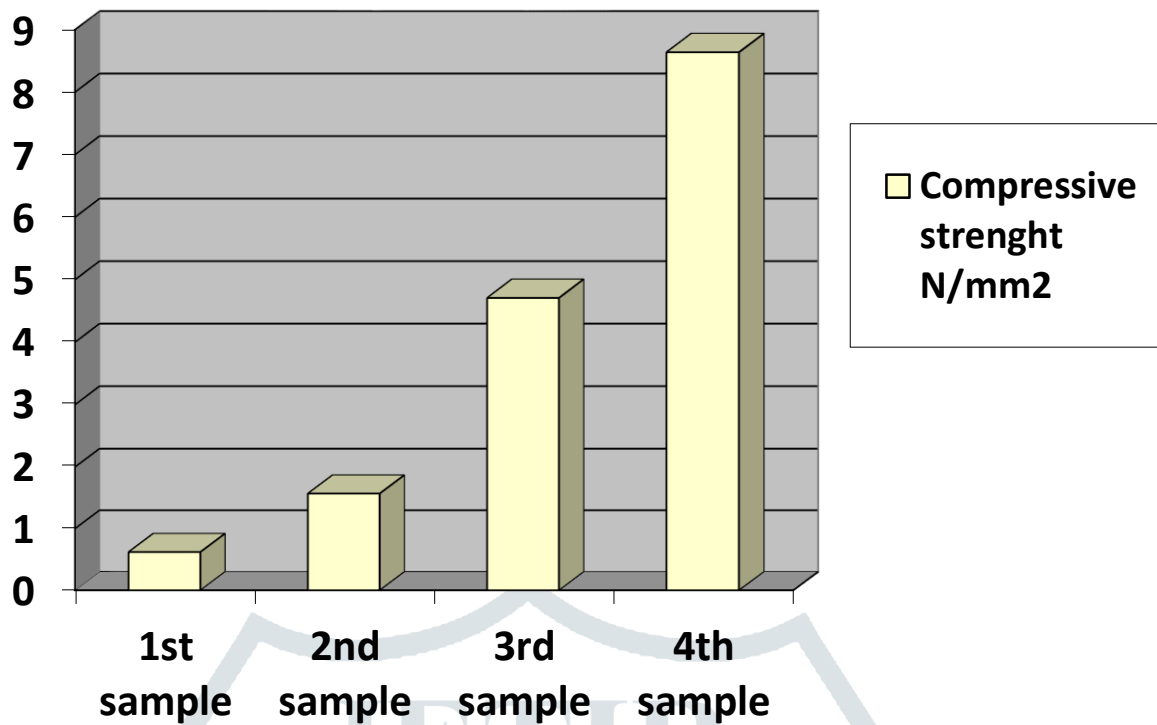
Paver block were prepared for following different proportion's

Block Type 1
 Plastic waste = 1
 Sand = 1.5
 Course aggregate =2.5

Block Type 2
 Plastic waste = 1
 Sand = 1.5
 Aggregate (10mm) = 2.5

Block Type 3
 Plastic waste = 1
 Sand = 4

Block Type 4
 Plastic waste = 1
 Sand = 1.6 (40%)
 Foundry sand = 2.4 (60%)



VI. Testing of Specimens:-

1.Compressive strength test:

Plastic paver blocks of size 265X120X100mm were casted. The most load at failure reading was taken and the common compressive strength is calculated using the following equation.

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



2. Hardness Test:

In this test, a scratch was made on brick surfaces. When the scratch is made with the assist of finger nail on the bricks, very light influence used to be left on the paver block surface. So this test results are sufficiently hard.

3. Soundness Test :

In this test two paver block of identical proportion were taken and they were struck with each other. The paver block were not broken and a clear ringing sound was produced. So the paver block are good.

VII . RESULTS & DISCUSSION

Block type	Plastic waste	Sand	Course aggregate	Foundry sand	Compressive strength (N/mm ²)
PB1	1	1.5	2.5	-	0.62
PB2	1	1.5	2.5 (10mm)	-	1.57
PB3	1	4	-	-	4.71
PB4	1	1.6	-	2.4	8.64

VIII.CONCLUSION :

According to the discussion of results the following conclusions are derived by this study:

1. The foundry sand paver block consist of waste materials and therefore cost is very low compared to conventional blocks.
2. Since, the waste materials are used, it reduces landfills and pollution problems.
3. The Paver block was not broken after falling from height of 1 m.
4. It can be used in non traffic and light traffic load and parking areas.

IX . REFERENCES:

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