

Plastic Paver Blocks of Waste Plastic By Analyzing Properties of Materials

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Received: 14 Feb 2020 Revised and Accepted: 25 March 2020

ABSTRACT: Discarding of plastic waste is the very complicated issue now because of it is very large amount and it takes more time to decompose nearly 10 to 1000 years. So finding methods to reuse in non-polluting manner is the difficult challenge. In this experiment the plastic bags (polythene) with M sand and OPC (Ordinary Portland cement) to be added to get a possibility of product this article effects of replacing M sand with plastic bags with different percent to increase the product properties. The research shows the use of polythene bag as fine binding material as range up to 10 to 25 percent. The result shows the product of plastic paver block with increase the properties such as ductility, light weight and more durable and highly stable with environmental impacts.

KEYWORDS: polythene bags, M sand, mechanical properties, compression strength, density.

I. INTRODUCTION

Anthropoid are every time create rubbish and discarding plastic in come what may the solid disposal management is not a contemporary. The changes are the amount and usage of plastic; the changes are the method of disposal and reducing the pollution caused by the polythene bags. The supplication of plastic is rapidly rising due to the minimum cost of it and conventional uses. Due to that particular reason the lofty of plastic growth which bring about task of disposal. Despite of the fitting of plastic for a more different applications, coordination are accept with the acute challenge of finding substitute way for discarding the huge capacities of squander stuffing. Discarding of plastic waste in surroundings is taken into account to be an enormous problem thanks to its very low biodegradability and presence in large quantities.

II. Materials Used

Polythene bags are the crystalline material with chemical resistance and posses' good corrosion resistance and fatigue and wearing resistance. Moreover, it's light weight material, innocuous substance, stainability, and provide excellent impact resistance and high lastingness . The polythene bags are collected from the college and they are being weighted and it is heated in the pan in the stage of melting the M sand is mixed to the plastic wax they are mixed thoroughly till the binding consistency.

Then the paste of plastic and M sand is mixed with the OPC in the 1: 4ratio of plastic mixture and cement. polythene having variety properties like permanence and impervious to corrosion, weathering resistance, sound. Energy conversation, good value, has durability, and easily handle. Therefore, during this project, hard-state recycling process is proposed to understand the direct recycling of polyethylene because the green engineering forming technology.

2.1 Cement

Cement is a tie up material in concrete, which ties the further substance to make a close-packed mass. usually, OPC is used for all structural and any construction projects. OPC is accessible in different grades of 33, 43, 53. In this research, we does not use any kind of cement in spite of we are using M sand to achieving the property of cement, because that M sand having equal strength of cement.

Table 2.1 Properties of cement

Properties	Value
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Fineness of cement	7.2%
Specific Gravity	2.9
Normal Consistency	29.5%
Soundness	6.8mm
Initial Setting Time of OPC	30 minutes
Final Setting Time of OPC	1 Hour

2.2 M Sand

The M sand is the manufactured sand. It is a alternative of conventional sand for all type of construction manufactured from hard granite by crushing.

2.2.1 Properties of M sand

High capability. M sand having both physical and chemical properties that can withstand any atmosphere and weathering conditions. It can enhanced durability , greater strength and more economy than river sand. Eco friendly and economical.

Table 2.2.1 Properties of M Sand

PROPERTIES	VALUE
Fineness modulus	2.53
Specific gravity	2.62
Size	Passing through 4.75 mm sieve
Water absorption ratio	1%
Grading	Zone II



Figure 1. M Sand

2.3 Polythene Bags

A Polythene bags are the content of non woven, fabric substance used everywhere, it is more corrosion resistance and also resistance to wear and tear. It is huge amount of wasted all round us, it is non degradable waste product used by humans. It is harmful substance to the living creatures of the world, so we get the idea to overcome with this solution.

2.3.1 Properties of polythene bags

Physical property

Melting point :105-115°C

Density :0.910-0.940g/cm³

Temperature resistance up to 80°C.

Chemical properties:

Plastic does not have the capability of soluble.

Combustibility: plastic, when it reaches certain temperatures, can deform or wax.
Permeability: Is the capacity of passing through solid without changing its frame.
 Polythenebags are not permeable.



Figure 2. M sand with LDPE

2.4. Water

Water is very essential of all construction, even we do not use the water for our project, but for the curing of plastic paver blocks we use water. The water with the least vale of pH of 5.5-6.5 is suitable of curing the paver blocks. The potential of hydrogen least within the range of 6 (pH 6).

III. Product Procedure

Polythene with M sand mixed to urge a uniform mixture to sew the tiny mould. Paver block kept with the mould until it dried, again kept in the water tank for 3-4 days for becoming hard and curing to extend their coherence. then , samples left from water to dry and check their capacities. The second step was putting the samples again in water for 7 and 28 days to check their strength and therefore the action of water on the paver blocks.

The plastic is collected from the school and from street and that they are separated as polythene and other plastic, other plastic than polythene are omitted. The polythene are completely melted till reach the entire liquid stage. Then the plastic in hot stage is pour within the M sand mixed it thoroughly till reach good paste form. Then this mixture is transfer to the paver mould with desired shape and style to urge a product. The product will help to scale back environmental pollution in additional quantity, also the assembly cost is extremely less when compare to standard paver block. The plastic is binding together during a proper consistency to urge a paver block in required properties.



Figure.3 Preparation of Paver Block

S.No	M sand(gm)	Melted polythene(ml)
1	250	500
2	500	600
3	750	700
4	1000	800

5	1250	1000
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Table 3 Mixing Ratio

3.1 Shape of product

The shape of the polythene mixture after casting is shown in the fig.



3.2 Density

The density is the properties of sand and soil its is tested for the knowing mass of the paver block. The weight of the plastic paver is less when compare to the conventional paver, so it is easy to handle and work.

S.No	Polythene %	M sand quantity%	Water%	Density
1	15	85	25	1.38
2	25	75	25	1.42
3	30	70	25	1.56
4	35	65	25	1.64
5	40	60	25	1.32

Table 3.2 Density of Paver Block

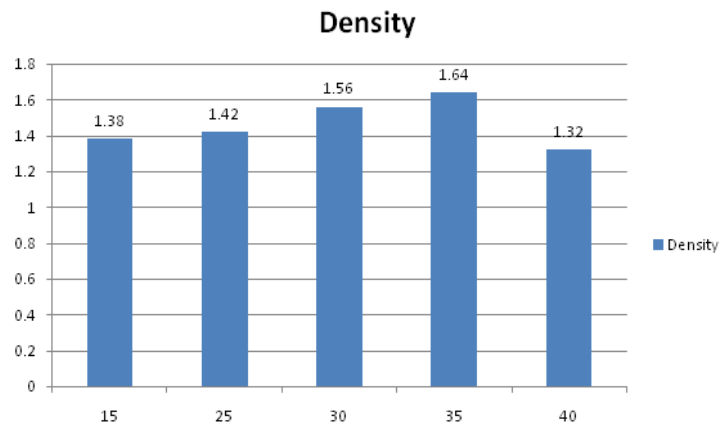


Figure 4. Graphical representation of Density

3.3 Compressive Strength

Yield points of plastic substance produced from LDPE waste and the M sand immersed 7days and 28days in water. The compression value of the paver are high compare to the normal block. It is also can be used for the purpose of partition wall construction, by moulding in standard size.

Table 3.3 Compressive Strength at 7 days and 28 days

S.No	LDPE %	Compression Value (N/mm ²) 7 days	Compression Value (N/mm ²) 28 days
1	15	438	1095
2	25	506	1205
3	30	551	1347
4	35	589	602
5	40	506	628

Figure 6. Compression Test

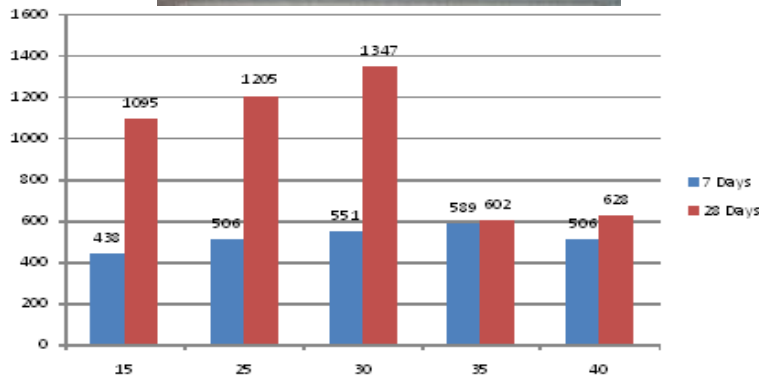
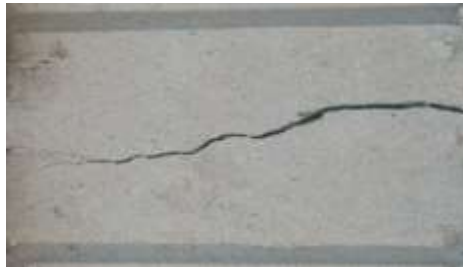


Figure 5. Graphical Representation of Compressive Strength at 7 days and 28 days

IV. Result Discussion and Conclusion

4.1 Conclusion

1. It is feasible to make plastic paver blocks from waste of polyethylene substance that produced from of anthropoid like packing of materials or crates. The outcome show that density of constructed polythene paver blocks was varied based on the percentage of waste polyethylene in the paver blocks mix design. It is changed with increasing the mixing of polythene bag up to 25% then reduced continuously .

2. The minimum density of polythene paver block is 0.89 gm/cm³ which is less than the density of conventional paver blocks t that produced from sand and Portland cement. The density reduction with 10% of conventional paver blocks.

The water content of polythene paver blocks that made in this project in between the order of 9.8% to 20.4% for paver blockss immersed 7 days in water. However, for products immersed 28 days, the water content was reduced

to be within the ratio between 0.9% to 12.9%. The suitable water content for the polythene paver block is 2.5% and 3.2% for this outcome with 20% and 30% waste polyethylene, respectively.

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