

MAKING OF PAVER BLOCKS FROM WASTE PLASTIC

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ABSTRACT

The aim of this project is to replace cement with plastic waste in paver block and to reduce the cost of paver block compared to that of conventional concrete paver blocks. At present nearly 56 lakh tones of plastic waste is produced in India per year. The degradation 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 quarry dust, coarse aggregate and ceramic waste. Plastic are rapidly growing segment of the municipal solid waste. Disposal of waste materials including waste plastic bags has become a serious problem.

INTRODUCTION

Plastic waste which is increasing day by day becomes eyesore and in turn pollutes the environment, especially in high mountain villages where no garbage collection system exists. A large amount of plastic is being brought into the tourist trekking regions are discarded or burned which leads to the contamination of environment and air. Hence, these waste plastics are to be effectively utilized. High-density polyethylene (HDPE) and polyethylene (PE) bags are cleaned and added with sand and aggregate at various percentages to obtain high strength blocks that possess thermal and sound insulation properties to control pollution and to reduce the overall cost of construction, this is one of the best ways to avoid the accumulation of plastic waste which is an on-degradable pollutant. Hence in this project, an attempt is made to study regard the properties of the blocks which is manufactured using plastic wastes.

MATERIAL USED

Aggregates

Aggregates are the important constituents in concrete. It give body to the concrete, reduce shrinkage and effect economy. Earlier, aggregates were considered as chemically inert materials but now it has been recognised that some of the aggregates are chemically active and also that certain aggregates exhibit chemical bond at the interface of aggregate and paste.

Crushed Sand (Dust)

All along in India, we have been using natural sand. The volume of concrete manufactured in India has not been much, when compared to some advanced countries. The infrastructure development such as express highway projects, power projects and industrial developments have started now. Availability of natural sand is getting depleted and also it is becoming costly. Concrete industry now will have to go for crushed sand or what is called manufactured sand.

Sand (Natural)

Sand is a granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. Sand can also refer to a texture class of soil or soil type; i.e., a soil containing more than 85 percent sand-sized particles by mass.

Plastic

Plastic is material consisting of any of a wide range of synthetic or semi-synthetic organic compounds that are malleable and so can be molded into solid objects. Plasticity is the general property of all materials which can deform

irreversibly without breaking but, in the class of moldable polymers, this occurs to such a degree that their actual name derives from this specific ability.

PROCEDURE

In first step we collected the waste plastic bags and the polyethylene bags are sorted out and remaining are disposed safely. Next the collected waste bags are cleaned with water and dried to remove the water present in it after this the plastics are burned out by using stones and firewood. The stones are arranged to hold the drum and the firewood is placed in the gap between the stones and it is ignited. The drum is placed over the above setup and it is heated to remove the moisture present in it. Then the plastic bags are added to the drum one by one and the river sand is added to the plastic when it turns into hot liquid. The sand is added is mixed thoroughly using rod and trowel before it hardens. The mixture has a very short setting hence mixing process must not consume more time on the other hand the process should be complete. In case of Paver blocks, Red oxide is added (less than 10% of the total weight) to impart dark red color. These mixtures is then poured in to the brick mould and they are compacted using steel rod and surface is finished using trowel. Before placing the mixture into the mould, the sides of the mould are oiled to easy removal of bricks.

TESTING PROCEDURE

To know the quality of plastic sand paver blocks following tests are performed on compression testing machine and abrasion testing machine.

- 1) Compressive Strength Test.
- 2) Abrasion Test.

TEST RESULTS

Table.No-1 Compressive Strength Test Results of Sand and Waste Plastic Material

Sr.No.	Mix proportion ratio	Waste plastic	Sand	Average Compressive Strength(N/mm ²)
1	1:2	1	2	5.90
2	1:3	1	3	13.54
3	1:4	1	4	7.72

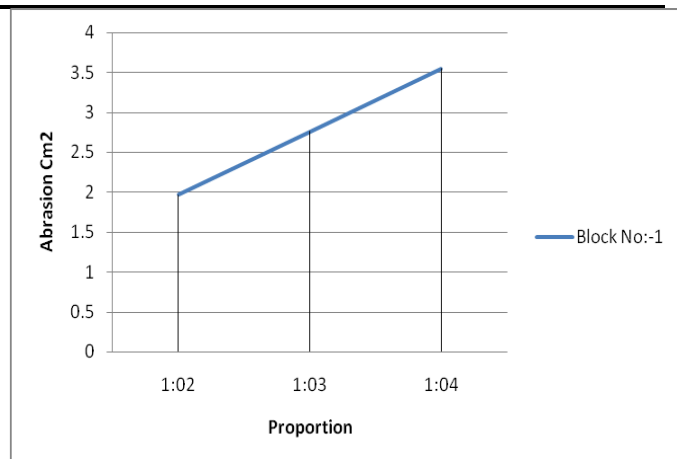


Fig.1 Compressive Strength Test

Table.No-2 Abrasion Test Results of Sand and Waste Plastic Material

Sr.No.	Mix proportion ratio	$\Delta v = \frac{\Delta m}{PR}$ cm ²
1	1:2	1.97
2	1:3	2.76
3	1:4	3.55

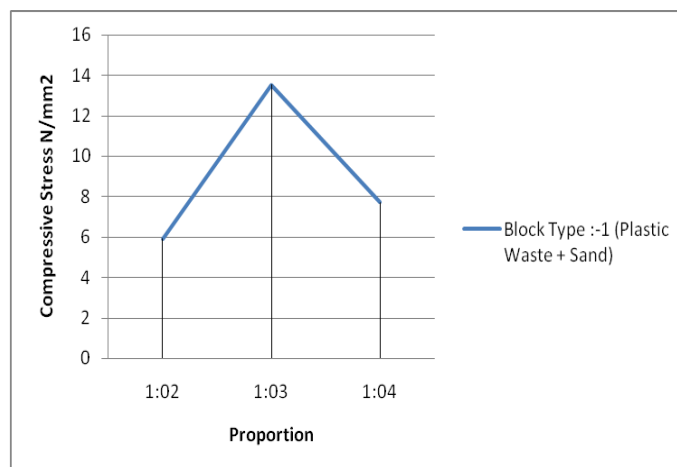


Fig.2 Abrasion Test

CONCLUSION

The Plastic sand bricks possess more advantages which include cost efficiency, removal of waste products thus abolishing the land requirement problem for dumping plastic, reduction in the emission of greenhouse gases by the conversion of flue gases into synthetic oil etc.

- 1) The cost of paver block is reduced when compared to that of concrete paver block by 35%
- 2) 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.

REFERENCES

- [1] Nivetha, C. Rubiya, M. Shobana, S. Vaijayanathi, G. (2016). Production of Plastic Paver Block from the Solid Waste. ARPN Journal of Engineering and Applied Science. 11(2).
- [2] Ganesh Tapkire. Satish Parihar. Pramod Patil. Hemra, R. Kumavat. (2014). Recycled Plastic used in Concrete Paver Block. International Journal of Research in Engineering and Technology, 3(09).
- [3] Poonam Sharma. Ramesh kumar Batra. (2016). Cement Concrete Paver Blocks for Rural Roads. International Journal of Current Engineering and Scientific Research, 3(1), 114-121.
- [4] Joel Santhosh. Ravikant Talluri. (2015). Manufacture of Interlocking Concrete Paving Blocks with Fly Ash and Glass Powder. International Journal of Civil Engineering and Technology, 6(4), 55-64.