

Waste Plastic Used In Paving Block With Replacement Of Fine Aggregate

¹Somnath Shegar, ²Priyanka Nalwade, ³Pratiksha Mohite, ⁴Mayuri Bendre,
⁵Shweta Desai, ⁶Mr. Pawar S.B

^{1,2,3,4,5}Student, SSIET's B. Tech College Ghogaon, Karad, Maharashtra, India

⁶Faculty, SSIET's B. Tech College Ghogaon, Karad, Maharashtra, India

ABSTRACT:

Nowadays use of plastic increasing in human life. Plastic waste produced up to 56 lakhs ton per year. Plastic waste is reachable in a quantity and therefore the value thing comes down when we have waste plastic then we can use as reused, recycle and reduce. Be mindful of what you buy, pay attention to the control of environmental pollution due to waste. Use of plastic waste which is non-biodegradable is rapidly growing in the surroundings, becoming a danger to the surroundings in many elements. This study dominators use of waste plastic for manufacturing the concrete paver block and with the environment friendly disposal way of plastic waste possible. Cement, fine aggregate (Crush Sand), Coarse aggregates, Plastic Waste and Admixtures are essential. For both ordinary and plastic paver block are design for required quantity material and compared by its durability and compressive strength. Plastic waste has been collected from public and industrial places. High Density Polyethylene (HDPE) waste plastic is collected, shredded with the help of shredder. The High-Density Polyethylene (HDPE) waste is collected after shredding in small parts it is used with replacement of fine aggregate, manufacturing paving block.

INTRODUCTION

Looking to the world trouble of environmental pollution by plastic consumer waste, lookup efforts have been targeted on consuming this waste on a big scale in an environment friendly manner. Plastic contains in solid as well as in finished state. Recycling plastic is very important because of this material is used in the manufacturing of various products; recycling is vital if we favor depart this planet for our future generations. When we have waste plastic then we can use as reuse, recycle and reuse, be conscious of what you do, pay attention to the items you buy and constantly test yourself to see if you want it or if it comes in package deal in much less waste. Plastic is evil. You can hardly do away with it. Every day we use plastic in daily lifestyle that is garbage, coffee cup, electronic material, plastic bags etc. so plastic is very harmful to humans, animals, marine and as well as to environment. However the place is all the plastic going? It would be beginning to word that billions of heaps of plastic are ending up in the world's oceans. Pollution precipitated by way of plastic is not only unsafe to marine existence but is additionally affecting the health of humans. The toxins are transferred in the meals chain as they get absorbed in the animal's bodies after they eat the plastic pieces. Human being devour as a result contaminated fish and mammals' plastic pollution is affecting the global financial system it is destroying the fishing and aquaculture industries. Plastic is mostly produced by household, tourism and trekking etc. In many countries, the composition of waste is different, that it is affected by using the socioeconomic characters, waste administration programs, and consumption patterns, but generally, the degree of plastic in the waste composition is high. One of the largest components of plastic waste is polyethylene which is observed by way of polypropylene. Plastics are being littered and misused all over the U.S. and now inflicting threat to the nation. Some of these issues related with plastic waste in India plastic block drains and gutters and motives floods. Plastics release poisonous fuel into the atmosphere when burnt. Plastics bottles and containers act as breeding ground for mosquitoes when stuffed with rainwater. High density polyethylene (HDPE) waste is used in making baggage and dustbins. These substances serve as a choice for the metallic dust packing containers and leather bags. Plastic is one fundamental issue of Municipal Solid Waste (MSW) which is turning into a foremost research problem for its possible use in pavement blocks. Polymer modified pavement blocks has purposes in footpath, avenue development and buildings. In this find out about waste High Density Polyethylene and polyethylene baggage have been shredded into flakes and was once used in the production of pavement blocks.

The biggest factor of the plastic waste is polyethylene, observed with the aid of polypropylene, polyethylene terephthalate and polystyrene. Fortunately, there are a variety of approaches in which waste plastics may want to be reuse or converted to other products. High density polyethylene (HDPE) waste is used in making bags and dustbins. Polymer modified pavement blocks has applications in avenue construction and buildings. Hence waste plastic baggage can therefore, be combined in concrete mass in some form, except huge impact on its other houses or slight compromise in strength. In this assignment waste plastic baggage accrued from municipal stable waste and used in the manufacturing of pavement blocks which commonly used in the park, roadside footpaths and in the yard of buildings.

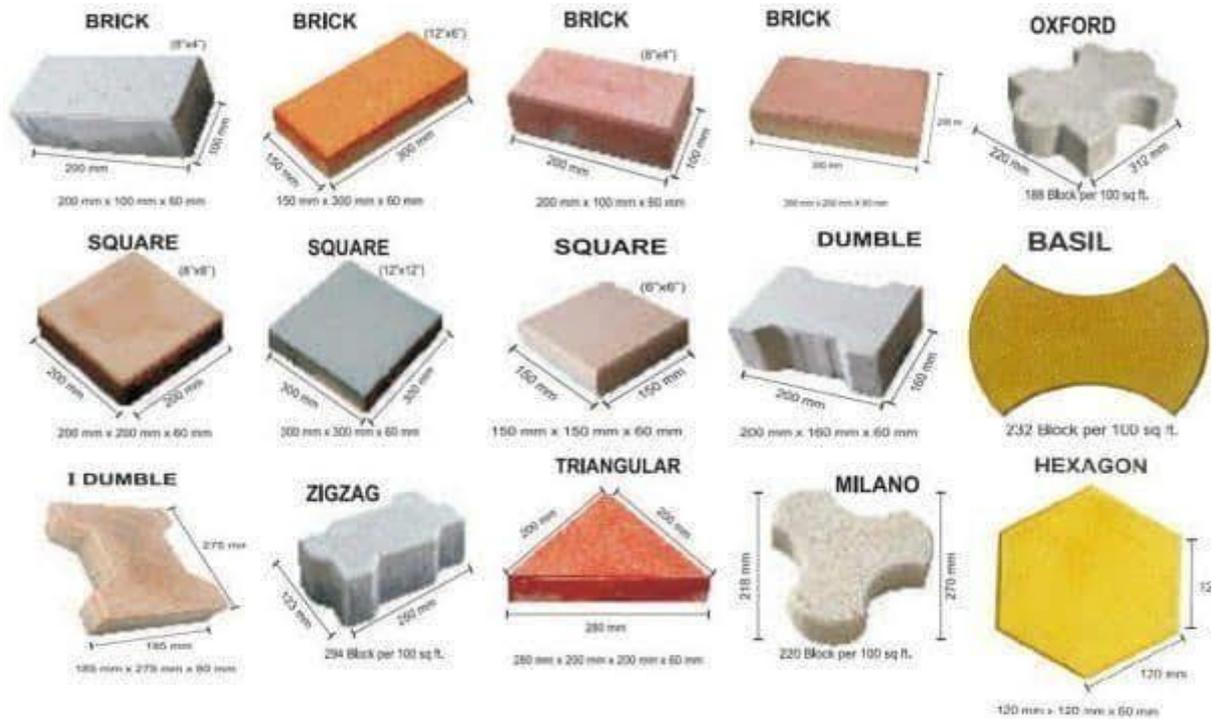


Fig no 1.1 Types of pavement Blocks



Fig no 1.2 High Density Polyethylene waste plastic crush (HDPE)

1.1 OBJECTIVES

1. To produce cost effective paverblock and eco-friendly paver block
2. To determine suitability of wasteplastic in the development of paver block
3. To examine the weight of wasteplastic paving block to traditional paving block..
4. To compare results of conventional and waste plastic paving block.

1.2 METHODOLOGY

1. To study the property of material for pavingblock.
2. Making the 24 numbers of paving blocks ofvarious proportion such as 10%,15%,20% waste plastic with replacement of fine aggregate.
3. Take a compressive strength test on waste plastic paver block after 7 days and 28 days.
4. To compare the results of waste plasticpaver block and conventional paver block.

2 EXPERIMENTATION

2.1 Material selection and its properties

For Manufacturing of everyday as properly as plastic paver blocks cement, Quarry dust, coarse aggregates, water and waste plastic bags are essential materials. Here in case of regular concrete paver blocks, waste plastic is now not used and on different hand plasticpaver blocks manufactured besides use of water as it carries waste plastic content. After performing a number assessments on used substances following observations are made

Table 1. Properties and observations of materials

	Properties of material	Observation
Cement	Specific Gravity	3.15
	Consistency	30 %
	Fineness	7
	Initial Setting Time	30 minutes
	Final Setting Time	600 minutes
Fine Aggregate	Size	Less than 4.75 mm
	Specific gravity	2.60
	Water Absorption	1.2 %
	Shape	Angular, Rough Texture
	Density	1600 kg/m ³
Coarse Aggregate	Size	More Than 4.75 mm
	Specific Gravity	2.65
	Water Absorption	0.6%
	Shape	Angular, Rough Texture
	Density	1450 Kg/m ³

- Moisture content of fine aggregate was found 2%.

Waste plastic

A material which contains one or more number of polymers having large molecular weight. Solid in its finished state or same state will manufacturing or processing into finished articles is known as Plastic. Waste management in respect to plastic can be done by recycling. If they are not recycled then they will become big pollutant to the environment as they not decompose easily and also not allow the water to percolate to the soil and they are also poisonous. Polyethylene

- Admixture used for the mixture of Hardener for improving compressive strength.

Terephthalate (PETE or PET), High-Density Polyethylene (HDPE), Polyvinyl chloride (PVC), Low density polyvinyl chloride, (LDPE) Polypropylene (PP), Polystyrene or Styrofoam (PS) are some examples of thermoplastic which can be recycled and which are used for making plastic paver blocks. Plastic used for making plastic paver block is accrued from a range of sources. The classification of Thermoplastic and its sources is tabulated as below.

Table -2. Waste plastic and its sources

Waste Plastic	origin
Low Density Polyethylene (LDPE)	Carry Bags, sack's, Milk Pouches, Cosmetic and detergent Bottles
High Density Polyethylene (HDPE)	Carry bags, Bottle caps, house hold articles etc
Polyethylene Terephthalate (PET)	Drinking Water bottles etc
Polypropylene (PP)	Detergent, Biscuit packets, Microwave Trays for Readymade meal etc
Polystyrene (PS)	Bottle Caps. Foamed polystyrene: food trays, egg boxes, disposable

2.2 Concrete Mix Design

It is the technique of selecting appropriate elements of concrete to attain compressive strength and durability of at its 28-day curing. For this study of concrete mix design is prepared for M30 grade as per IS 10262-2000 and by IS 456-2000 for both normal and plastic pavement blocks. Water cement ratio taken for regular concrete is 0.5 and for plastic paver block no moisture is added. For casting of block rectangular mould have been prepared which has extent of 0.0024 m³ each. The volume of materials required per cubic meter is decided IS method. Depending on the capability paver mold amount of each material for each regular and plastic paver block is found to be as following.

Table-3. Amount of Constituents

Material	Ordinary Paver Block	Plastic Paver Blocks (10% Replacement of fine aggregate)	Plastic Paver Blocks (15% Replacement of fine aggregate)	Plastic Paver Blocks (20% Replacement of fine aggregate)
Cement	1.61 kg	1.61 kg	1.61 kg	1.61 kg
Fine Aggregate	1.34 kg	1.24 kg	1.13 kg	1.07 kg
Coarse Aggregate	2.46 kg	2.46 kg	2.46 kg	2.46 kg
Water	0.4 Litre	0.4 Litre	0.4 litre	0.4 litre
Waste Plastic	----	100 gm	200 gm	268 gm
Admixture	17 gm	17 gm	17 gm	17 gm

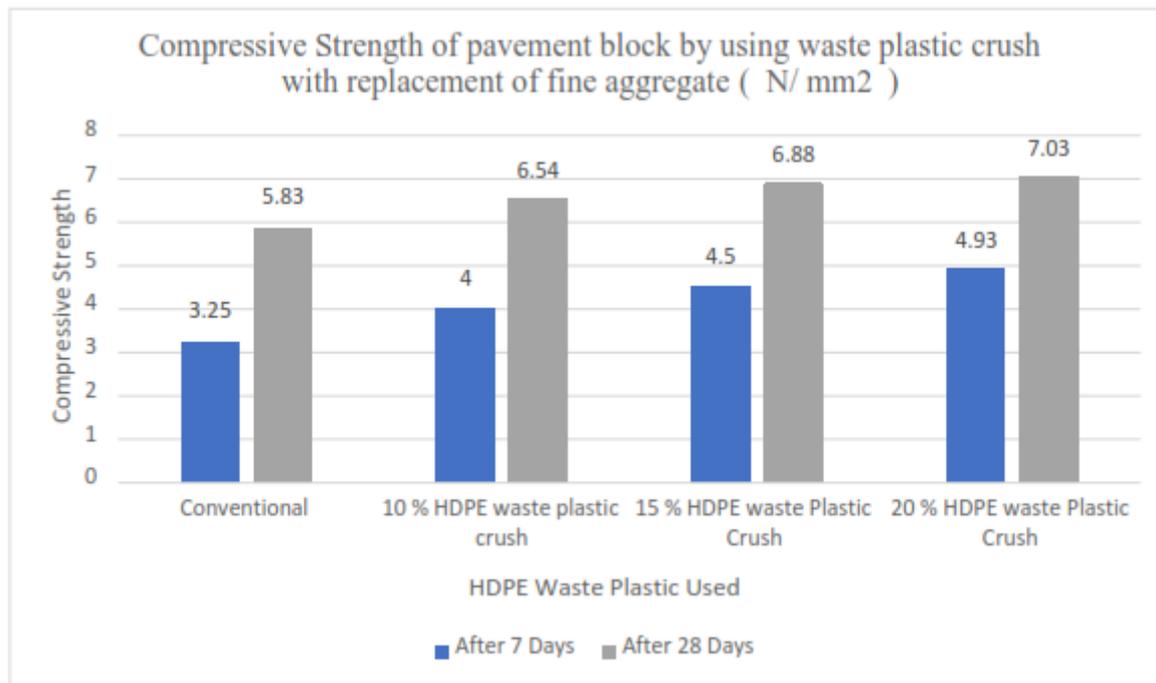
For the present study 3 cubes of every proportion of volume 0.0024 m³ are to be casted. Concrete process includes batching, mixing, placing followed by curing for numbers of days.

In the case of plastic paver block shredded waste plastic is to be done. And then that crushed plastic added into other ingredients for making plastic paver block.

3. RESULT AND DISCUSSION

After adequate curing of both regular and plastic concrete block it has to be checked below compression trying out computing device (CTM) to understand its compressive strength underneath step by step applied compressive force on the specimen. After placing the paver block the platform and applied the load on a easy floor steadily and uniformly at the fee of till the block failed. Noted the load at which it failed and divided it with the aid of the cross-sectional vicinity of paver block offers the compressive strength of the specimen. Test effects of the ordinary concrete block and plastic paver blocks after 7 day curing are tabulated below.

Graph 1 . Compressive strength for 7-day And 28 - day curing



From the above table it is clear that average compressive electricity for ordinary paverblock is N/mm² and for plastic paver block After 7 Days the check end result for Similarly compressive electricity checked for the paver blocks after 28 days curing for each the samples. The take a look at result determined to be as follows.

1. CONCLUSIONS Plastic is very hard polluted ingredient in the nature so used in the paving block to reduce the pollution in the area.
2. The finishing, shape, interlocking and appearance of the plastic paving block are good as conventional concrete paving block.
3. The strength of the Plastic paver block is high than the concrete block, so these blocks are suitable for the heavy traffic.
4. These blocks are used in the park and, on foot path of the road. It also used in the making mile stone, side guard in the road construction.
5. The utilization of waste plastic in manufacturing of paver block has productive way of disposal of plastic waste.

4. FUTURE SCOPE

For the landscaping purpose of bungalow and apartments you need spectacular entrance with lavish look of outdoor flooring, you can have various options but to increase the visible features I strongly think and recommend that Plastic paver block plays the best, economic and easiest way to fulfill the purpose. Plastic Paver block being industrial products are comparatively hard and stiff for pedestrians and vehicular traffic. These solid precast pavers are versatile, aesthetically attractive and require less or no maintenance if correctly manufactured and installed. Plastic Paver blocks are very common and have popular method of hard landscaping which is worthy for applications like, driveways, paths, municipal gardens, garages, roads, etc

REFERENCE

- [1] Poonam Sharma. Ramesh Kumar Batra., Cement Concrete Paver Blocks for Rural Roads. International Journal of Current Engineering and Scientific Research, ISSN: 114-121. Vol 3, Issue: 01(2016).
- [2] Joel Santhosh. Ravikant Talluri. Manufacture of Interlocking Concrete Paving Blocks with Fly Ash and Glass Powder. International Journal of Civil Engineering and Technology, ISSN:55-64, Vol:06, Issue:04 (2015).
- [3] Nivetha, C. Rubiya, M. Shobana, S. Vaijayanathi, Production of Plastic Paver Block from the Solid Waste. ARPJN Journal of Engineering and Applied Science. G.ISSN.1819-6608: Vol.11 Issue 02 (2016).
- [4] R.L. Rame, Recycled plastics used as coarse aggregate for constructional concrete, project reference no 37S1114, ISSN:2319- 8753, Vol:02, Issue :03, March (2013)
- [5] Ganesh Tapkire. Satish Parihar. Pramod Patil. Hemra, R. Kumavat, Recycled Plastic used in Concrete Paver Block. International Journal of Research in Engineering and Technology, ISSN:2321-7308: Vol.3, Issue09, (2014)
- [6] B. Shanmugavalli, B. Eswara Moorthy, Reuse of Plastic Waste in Paver Blocks, ISSN:2278- 0181: Vol. 6 Issue 02, February- (2017).
- [7] Raghatate Atul M, use of plastic in a concrete to improve its properties, ISSN2249-8974 IJAERS/Vol. I/ Issue III/April-June, 2012/109-111
- [8] Praveen Mathew et al, Utilization of plastic bags in concrete block, Literature Review, Volume 2, Issue 6 JETIR ISSN- 2349- 5162. June(2015).