



# Preparation of Pavement Block by Using Plastic Waste

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## ABSTRACT

Nowadays, there is a considerable increase in pollution on earth, in this plastic plays very dominant role in production of waste. Hence to minimize the generation of plastic, it is necessary to re-use of plastic in technical way. In this project, the waste plastic materials are used in the preparation of pavement blocks. Plastic waste is heated and melted at a temperature around 200°F and mixed with the coarser sand. After that filled in particular mould to get required shape. The pavement blocks are tested for compressive strength and compared with conventional pavement blocks. It is concluded that, by using plastic, blocks are light in weight, more durable, and finally we can reduce the plastic waste generation. By this we can put one step ahead towards Swacha Bharat.

Keywords—plastic waste, Swachh Bharat

## 1. INTRODUCTION

The composition of waste is different in different areas based on the socioeconomic characters, waste management programs and consumption patterns were designed but the amount of plastic in the overall waste composition is high in the environment. Plastic waste is increasing due to increase in population, urbanization and development. The disposal of waste plastic has become a serious problem globally due to their non-biodegradability

A material, that contain one or more organic polymer of large molecular weight, solid in its finished state, can be shaped by its flow is called as "plastic". The durability of plastic is high and it degrades very slowly. And also plastic has high resistant to degradation. Plastic can be divided into two major categories- thermoses & thermoplastics. Addition of plastic waste in construction of pavements reduces the plastic shrinkage and drying shrinkage. The use of waste plastic improves the abrasion & slip resistance of asphalt pavement. In India, because of hot and extremely humid climate, plastic pavements of greatest advantage. Use of higher percentage of plastic waste reduces the need of bitumen by 10%. It also increases the strength and performance of the road. Plastic increases the melting point of bitumen and hence missing can be done in more better and easier way. It takes 20 – 1000 years based on their composition. In construction sector, we can use the plastic waste on a very large scale after recycling it, which means the problem of plastic waste can be removed for a long time period. It seems to be more practicable and efficient method to solve this problem. Paver block paving is versatile, aesthetically attractive, functional,

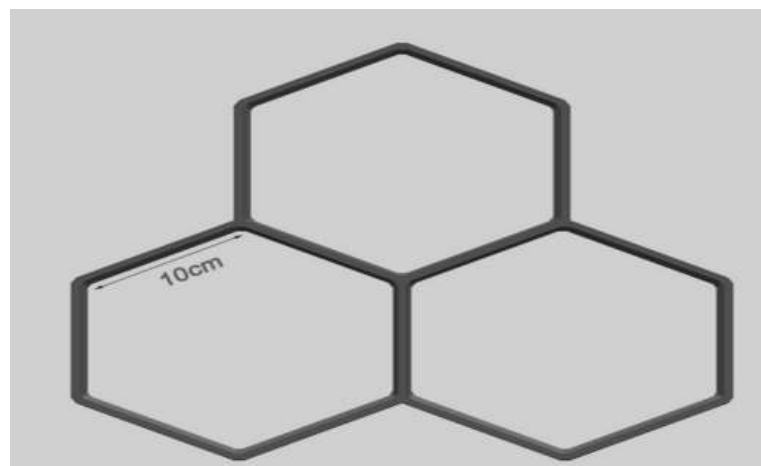
and cost effective. and requires little or no maintenance if correctly. manufactured and laid. Most concrete block. paving constructed in India also has performed satisfactorily but two. main areas of concern are occasional failure due to excessive surface wear, and variability in the strength of block. The sustainable development for construction involves 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. With the view to investigate the behavior of quarry rock dust, recycled plastic, production of plastic paver block from the solid waste a critical review of literature was taken up. An attempt was made by Nivetha C et.al to reuse the solid waste quarry dust fly-ash and PET with an aim not to lose the strength far from original Paver blocks. Amount of waste plastic being accumulated in 21st centuries has created big challenges for their disposal, thus obliging the authorities to invest in felicitating the use of waste plastic as coarse aggregate in a concrete is fundamental to the booming construction industry.

## 2. OBJECTIVES

1. To investigate the physical properties of recycled plastic in the preparation of pavement blocks.
2. To check the strength of plastic pavement blocks with respect to normal pavement blocks.
3. To determine the water absorption property of the pavement blocks.

## 3. MATERIALS

- plastic, sand ,container for heating, moulds and testing setup
- Temperature required to melt plastic : 212 degree Fahrenheit



**Fig 3.1 dimension of mould size**



#### 4. METHODOLOGY

##### COLLECTING THE WASTEPLASTIC:

- Collecting plastic bags and bottles
- Collecting Plastic covers or buy them from middle-men who collect it.

##### MELTING THE MIXTURE:

- Take a simple container(sheet metal )
- And safety equipment, including eye protection, breathing apparatus, gloves.
- Then the waste plastic is added into the container and heated up to the waste plastic converted into the liquid form.

##### MIXING:

Known quantity of Coarse Sand is added into the melted plastic waste and mixed in up to a smooth consistency.

##### MOULDING:

Add the mixture to the specified moulds

##### DRYING:

After moulding place the moulds to the Sun to dry for up to 24 Hours.

##### Experimental tests:

- After 24 hours unmould the setup
- And allow the payment mould for different tests

Tests conducted are:

- Compressive test
- Water absorption test

#### 5. RESULTS

**Table 5.1 Comparison between plastic paver blocks and conventional blocks**

	plastic paver blocks compressive strength in N/mm <sup>2</sup>		Conventional blocks compressive strength in N/mm <sup>2</sup>	
	1:3	1:6	1:3	1:6
Ratios	1:3	1:6	1:3	1:6
3 days	13.04	15.60	8.50	4.08
	15.02	16.10	6.93	3.16
	14.12	15.03	7.34	3.16
11 days	14.36	16.30	16.32	8.36
	13.35	16.50	17.55	8.38
	14.26	15.70	15.10	6.85

**Table 5.2 water absorption test results**

Type of block	Water absorption	Avg
Sand plastic(1:3)	0.76%	0.62%
	0.51%	
	0.60%	
Sand plastic(1:6)	0.24%	0.37%
	0.48%	
	0.39%	

## CONCLUSIONS

- Plastic paver blocks can be used in all weather conditions .no curing is required for making of plastic paver blocks.
- The weight of plastic paver blocks (0.39-0.41kg) less as compared to the normal paver blocks (0.79-0.85kg).
- By this work we are trying to reduce the waste up to 70-80% which is non-degradable.
- Strength of paver blocks (14-16N/mm<sup>2</sup>) as good as compared to the normal paver blocks (10-12N/mm<sup>2</sup>).
- Finally this project is helpful for the “swachha bharath abhiyan” campaign, started by government of India for making clean India and green India.

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