

# Design and Development of Paver Block making Machine

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**Abstract:** Plastic waste is increasing day by day which pollute Earth and this problem is big in tourist destination like near sea and in the mountains and to solve this we want to replace conventional paver block with paver block made from Plastic Waste. HDPE, PET and LDPE plastic are available in large quantity in the form of bags, drinking water bottle and many. Hence, we can use this waste into paving block to save environment from plastic pollutants. The aim in this project is to design and construction of paver block making machine which is economical that any person can buy this machine and can start manufacturing of plastic paver blocks which will be environmentally friendly.

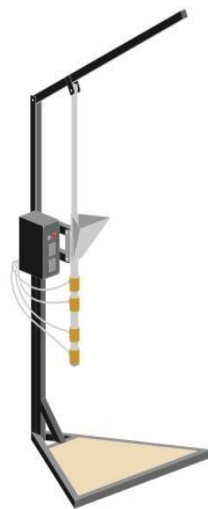
**Key words:** Plastic Paver Block, Plastic Waste, Environmental Pollution, Waste management etc.

## 1. Introduction

Plastic is by far the best invention for human in today's generation because of these many problems were solved but the main problem of plastic is that it is non-biodegradable and Plastic Products like water-bottle, plastic chair-table and etc are made from 'virgin plastic granules' and after use of these plastic product, people thrown away these things and because of its non-biodegradable property it starts to pollute land, water and air. So, our project is to utilize that used plastic waste and make paver block. Many Research paper suggest that plastic paver block can replace concrete paver block but they have not developed any mechanism for that. By the use of mechanism that we have designed any person can start their own setup to make plastic paver blocks. 5) Concrete using Ordinary Portland cement easily corrode structure but this plastic using concrete will not deteriorate as mentioned in the IS Code. Hence, plastic wastes can be minimized and destroyed in the rural areas. All foundation of civil works can be prepared by putting plastic wastes by Non intrusion of sea water or salt water agencies. 4)The utilization of waste plastic in production of paver blocks has a productive way of disposal of plastic waste. Paver blocks made using plastic waste, quarry dust, coarse aggregate and ceramic waste have shown better results. It also shows good heat resistance. It can be used in non-traffic and light traffic roads like pedestrian road, cycling road, in parking space or in park as it can sustain same stress as conventional concrete paver block.

## 2. Project Setup and Process Layout

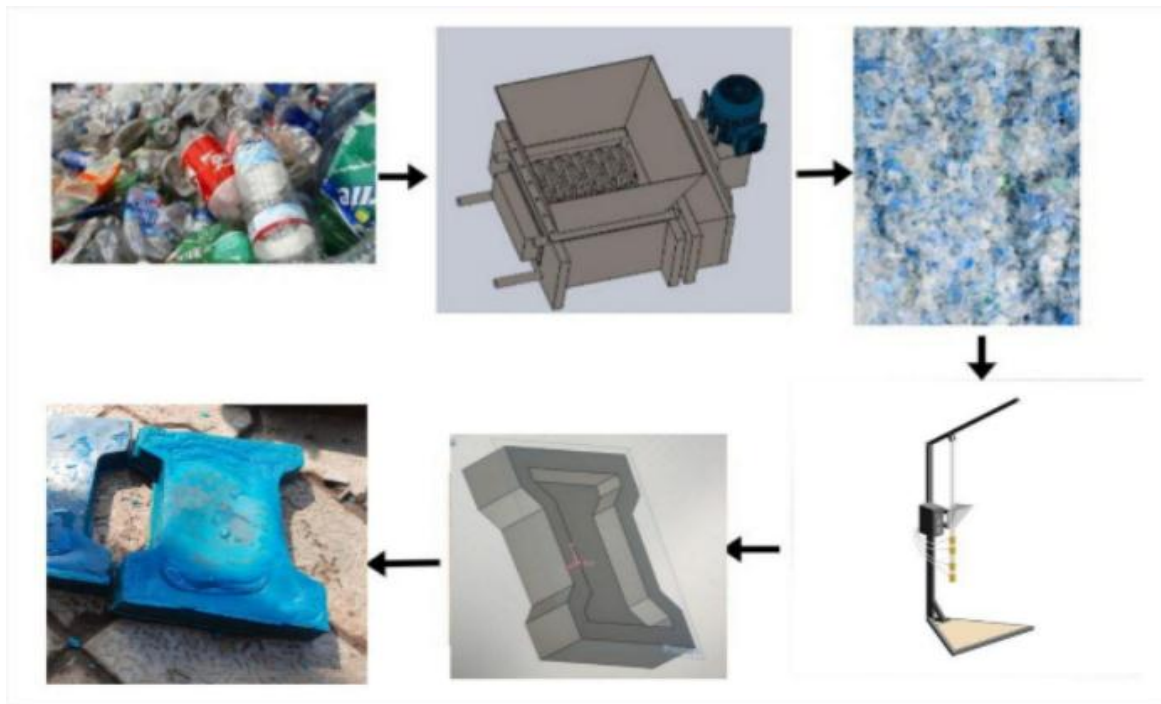
We have Designed and Constructed this mechanism that makes plastic paver block using injection moulding principal.



Injection Moulding mechanism

First, we collect Plastic waste from surrounding and then we pass that plastic waste through crusher to transform that plastic waste into small flexes. After that we add those flexes into mechanism through Hopper and wait till the plastic melts. As Plastic into the mechanism melts, we apply pressure on it by pushrod with Human efforts. Then molten plastic comes out of the nozzle

and gets collect into the die and then we press the die to give the correct shape to paver block. As mentioned in the writeup Here is the whole Process layout of manufacturing of Plastic Paver block.



Plastic waste – Crusher – Plastic Flex – Moulding machine – Die – Block

### 3. Objective of Project:

- 1) To manage Plastic waste in ecosystem
- 2) To develop Paving block which will have longer working life than conventional paver blocks
- 3) To design and develop mechanism which makes Paver blocks economically
- 4) To do Compressive, Split tensile and Water Absorption test on both (Plastic and Concrete) Paver blocks and Comparison

### 4. Specimen Testing:

Plastic paver block compares to concrete block.

Material A: Concrete Block (200x100x55 mm<sup>3</sup>)

Material B: Plastic Block (200x100x55 mm<sup>3</sup>)

Material C: Plastic Block (Standard shaped paver block with 30 mm Thickness)

#### Compression Testing (N/mm<sup>2</sup>):

Sr. No.	Specimen 1	Specimen 2
Material A	31.572	30.196
Material B	72.76	84.74
Material C	31.961	30.3692

#### Split Tensile Testing(N/mm<sup>2</sup>):

Sr. No.	Specimen 1	Specimen 2
Material A	1.29	1.478
Material B	12.346	15.0167

### Water Absorption Test:

W<sub>w</sub> = Weight of specimen after taking out from water

W<sub>d</sub> = Weight of specimen after we dried it for 24 Hours.

And by these two Parameters the Percentage of water absorption is calculated for both concrete and plastic Paver blocks by the equation given below.

$$W \text{ percent} = \frac{W_w - W_d}{W_d} \times 100$$

	Specimen 1	Specimen 2
Material A	3.97%	3.71%
Material B	1.36%	1.46%

### 5. Conclusion

As per our tests observations and calculations we can conclude that due to higher material cost of plastic waste the overall cost of Plastic paver block is higher than Concrete Paver block but from the environmental point of view Plastic paver block is better option to use. According to test results the Plastic paver blocks are having higher compressive and split tensile strength because Concrete's brittle behaviour it does not show much deformation before Fracture but paver block from plastic waste shows considerable deformation before actual fracture.

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