

Waste Plastic Into Paver Blocks

Nemali Deepika¹ Dumpaty Saikiran² Gaddi Muralikrishna³ Kalagadda Bharath⁴ Polasa Manusha⁵

¹Assistant Professor & Head of Department ^{2,3,4,5}B.Tech Student

^{1,2,3,4,5}Department of Civil Engineering

^{1,2,3,4,5}Jawaharlal Nehru Technology University, Kshatriya College of Engineering, Nizamabad, India

Abstract— 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. The main aim of this project is to replace cement with plastic waste in paver block and to reduce the cost of paver block when compared to that of convention concrete paver blocks. At present nearly 56 lakhs tones of plastic waste is produced in India per year. The degradation rate 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 different proportions with fine aggregate or robo sand and polythene waste. The paver blocks were prepared and tested and the results were discussed.

Key words: Waste Plastic, Fine Aggregate

I. INTRODUCTION

The waste plastic will be large in household time. In many countries the compositions of waste is different, that it is affected by the socioeconomic characters, waste management programs and consumption patterns, but generally the level of plastic in the waste composition is high. One of the largest component of plastic waste is polyethylene which is followed by polypropylene.

Polyethylene terephthalate and Polystyrene. The large volume of materials required for construction is potentially a major area for the reuse of waste materials. Recycling the plastics has advantages since it is widely used and has a long service life, which means that the waste is being removed from the waste stream for a long period.

Because the amount of clay required to make bricks is large, the environmental benefits are not only related to the safe disposal of bulk waste, but also to the reduction of environmental impacts that arise due to burning of plastics.

Plastics also help to conserve energy at the home furthermore, the U.S. Department of Energy estimates that use of plastic foam insulation in homes and buildings each year will ultimately save close to 60 million barrels of oil versus other kinds of insulation. The same principles apply in appliances such as refrigerators and air conditioners.

II. OBJECTIVES OF THE STUDY

- 1) Sustainable development of structural paving Blocks.
- 2) Find the alternatives of basic materials which are used in construction.
- 3) Use various waste material in construction process.

III. METHODOLOGY

A. General

These part points of interest the different tests directed in the research center with a specific end goal to think about the attributes of base course material. In the present examination

tests were gathered to evaluate the reasonableness of waste plastic material as binding mixture of paver blocks.

B. Study Methodology

The study methodology is represented in the form of flow chart as shown in Figure 1

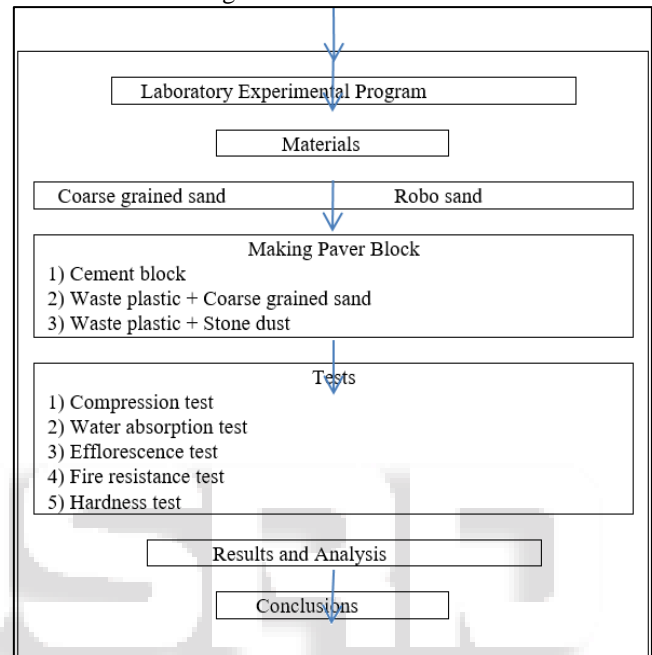


Fig. 1: Study Methodology

C. Materials

The materials used in this study for paver block production were plastic and sand or Robo sand as the main matrix and other materials are given below:

Overalls, gloves, masks, covered shoes or boots

- Melting barrel
- Firewood or other solid fuel
- Clay, dry, sieved sharp sand
- Tile mould
- Used engine oil
- Metal table
- Trowel

D. Plastic

It is important to only select the correct type of plastic. This is because different types of plastic melt and burn at different temperatures and have different physical qualities. The process described here works well with LDPE1.

Water bags, non-woven plastic shopping bags and plastic film are usually made of LDPE. It is important that you do not use other types of plastic-it could be harmful to your health.

E. Sand

Sand is naturally occurring 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 textural class of soil or soil type; i.e. a soil containing more than 85% sand sized particles by mass.

F. Testing Programme

This block displays the nitty gritty testing program arranged and performed in the whole examination. It shows the fundamental properties of Paver Blocks.

IV. CONCLUSIONS

A. Conclusions

In light of the directed in lab the accompanying conclusions have been drawn.

The concrete consists of cement, fine aggregate, coarse aggregate and water. The PVC powder is replaced for in 0%, 10%, 20% and 30% out of these, 20% of PVC by weight of sand is the optimum content which does not affect the properties of concrete. It is possible to use the plastic up to 20% by weight of fine aggregate.

B. Compression Test

For the Paver Block we have to do the test and to know the compressive strength of the block. The crushing strength of the paver block is to be 8.19N/mm² for comparing the ordinary brick. The crushing strength of the ordinary block is to be 7.17N/mm²

C. Water Absorption Test

For the Paver Block first weighted in dry condition and they are immersed in water for 24 hours. After that they are wiped out with cloth. Then difference between the Fly ash brick and burnt bricks and Plastic paver blocks are to be 8.012 and 9.086 and 1.10.

D. Efflorescence Test

The presence of alkalis in bricks is harmful and they form a grey or white layer on brick surface by absorbing moisture. To find out the presence of alkalis in bricks this test is performed. In this test a brick is immersed in fresh water for 24 hours and then it is taken out from water and allowed to dry in shade. The plastic sand brick has low alkali content and so a little white patch is formed over the surface. Depicts of the water absorption in 24 hours has to be the plastic paver block and ordinary block values as to be 1.082 and 3.079.

E. Fire Resistance Test

For the plastic is highly susceptible to fire out in case of Plastic sand bricks/Paver blocks the presence of sand imparts insulation. There is no change in the structural properties of block of bricks up to 180°C above which visible cracks are seen and the blocks/bricks deteriorate with increase in temperature.

F. Hardness Test

For this test a scratch is made with steel rod which has been difficult to imply the bricks or blocks were hard. This method is suitable for the countries which have the difficulty to dispose/recycle the plastic waste. The natural resources

consumed for the manufacturing of Plastic sand bricks and paver blocks are very much less when compared to its counterparts. The manufacturing cost could be reduced further by replacing the river sand with quarry dust or other waste products. Owing to the numerous advantages further research would improve the quality and durability of plastic sand bricks and paver blocks.

V. SCOPE FOR FURTHER INVESTIGATION

- 1) Bituminous pavement
- 2) Waste as building solution (PET)
- 3) Roof tiles
- 4) Plastic formwork

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