

A Review Study on Paving Block by use of Waste Plastic Material and Waste Abstract of Coconut

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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. 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 utilised. High-density polyethylene (HDPE) and polyethylene (PE) bags are cleaned and added with sand and aggregate at various percentages to obtain high strength bricks 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. This alternatively saves the quanta of sand/clay that has to be taken away from the precious river beds/mines. The plastic waste is naturally available in surplus quantity and hence the cost factor comes down. Also Colouring agents can be added to the mixture to attain desired shades. Hence in this thesis, an attempt is made to study regard the properties of the brick which is manufactured using plastic wastes. Keywords-Plastic waste, high density polyethylene, polyethylene, properties, bricks, ferric oxide.

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I. INTRODUCTION

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. Natural resources are depleting worldwide at the same time the generated wastes from the industry and residential area are increasing substantially. 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. Plastic waste used in this work was brought from the surrounding areas. Currently about 56 lakh tonnes of plastic waste dumped in India in a year. The dumped waste pollutes the surrounding environment. As the result it affects both human beings and animals in direct and indirect ways. Hence it necessary to dispose the plastic waste properly as per the regulations provided by our government. The replacement of plastic waste for cement provides potential environmental as well as economic benefits. With the view to investigate the behaviour 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.al¹ to reuse the solid waste quarry dust fly-ash and PET with an aim not to lose the strength fa from original Paver blocks. From the observations of test results, PET can be reused with 50% of quarry dust and 25 % of fly-ash in Plastic Paver block. The physical and mechanical properties of materials used in Plastic Paver block were investigated. For the test 6 cubes cube were cast for measuring Compressive strength. Satish Parihar et.al² used recycled plastic aggregate in various proportions in concrete mix and check there stability. 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 coarse aggregate in a concrete is fundamental to the booming construction industry. Three replacement levels of 10 %, 20 %, 30 by weight of aggregates were used for the preparation of the concrete. Poonam Sharma³ et. al. discussed about cement concrete paver blocks for rural roads. The study of Joel Santhosh and Ravikant Talluri⁴ indicated that fly ash and waste glass powder can effectively be used as cement replacement without substantial change in strength.

A. Test Conduct on Specimen

Compressive test this is done to know the compressive strength of the bricks and paver blocks. This is also called crushing strength of bricks and paver blocks. Generally five specimens of bricks are taken to laboratory for testing and tested one by one. In this test a brick and paver block specimen is put on crushing machine and applied pressure till it breaks. The ultimate pressure at which brick is crushed is taken into account. All five brick specimens are tested one by one and average result is taken as brick's compressive /crushing strength. The plastic sand bricks and paver blocks of different ratios are tested one by one and in this the high compression is found and comparison made between the fly ash and normal bricks.

Water absorption test in this the bricks first weighted in dry condition and they are immersed in water for 24 hours. After that they are taken out from water and they are wipe out with cloth. Then the difference between the dry and wet bricks percentage are calculated.

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's 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

Fire resistance test The Plastic is highly susceptible to fire but 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.

Hardness test In this test a scratch is made on brick surface with steel rod (any hard material can be used) which was difficult to imply the bricks or blocks were hard. This shows the brick possess high quality

II. LECTURE REVIEW

- 1) S. Agyeman. Et.al. (6 May 2019) Mr S. Agyeman conclude that the Control (without plastic) specimens were low compressive strength than that of the low and high in plastic specimens. In addition, concrete paving block specimens absorbed more water than the composite specimens did. The results revealed further that paving units could be made from RPW wastes ranging from shrink-wrap, dry cleaning film, merchandise bags, grocery sacks and stretch wrap, recycle bags, redemption bags, pure water sachet rubber, bubble packaging film, commercial/industrial liners/bags to commercial overwrap. Waste plastic materials may be used as a binding material for making of paving blocks capable of supporting low loadbearing purposes such as walkways, footpaths, building premises among others in highly moist environments due to their low water absorption capacity.
- 2) Amit Gawande et al.(7 June 2019) The plastics and bricks will possess more advantages which include cost efficiency removal of waste products purse abolishing the land requirement problem for dumping plastic, reduction in the emission of greenhouse gases why conversion of flue gases into synthetic oil and to protect marine wildlife from deadly plastic pollution.
- 3) P.SURESH et.al.(9 Nov. 2019) Mr. P.SURESH was conclude that the utilization of waste plastic in production of paving block has productive way of disposal plastic waste. The cost of paving block is reduced when compared to that of concrete paving block. Paving block made using plastic waste, sand shown in better result.
- 4) Mohan D.M et.al. (2013) Mr. Mohan D.M. derived that the waste plastics can be used in the pavement block production. This modified pavement block is applicable in the construction of rigid pavements.
- 5) Nor Baizura Hamid et. al.(July 2019) Mr.Nor Baizura Hamid concluded that, workability of control paving blocks are better than Eco-Friendly Paving Block although these two type of paving are in real slump phase. For density, Eco-Friendly Paving Block result are more better than control paving block and this show Eco-Friendly Paving Block are less density and more lighter than control paving blocks. Compressive strength for Eco-Friendly Paving Block decrease with days compared to control paving blocks where the result are increase.
- 6) Jeevan Ghuge et.al.(April 2019) Mr. Jeevan Ghuge was conclude that it is clear that plastic paver block has almost equal strength as that of ordinary one. The utilization of waste plastic in production of paver block has productive way of disposal of plastic waste.
- 7) Mukesh Chavan et.al. (March 2019) Mr. Mukesh Chavan was declared that it is possible to use plastic in concrete, and it is having the bonding property. In general plastic is used in manufacturing and construction of bricks, roads, etc. It is the best way of disposal of plastic waste and it is a partial solution to the environmental and ecological challenges associated with the use of plastics.
- 8) Abhishek Dhoke et. al.(April 2020) Mr. Abhishek Dhoke conclude that the natural available resources used for the manufacturing of Plastic Paver blocks are very less when compared to its corresponding material. If we use fly ash/quarry dust or other waste products. There is chance of cost reduction in manufacturing.
- 9) Pooja Bhatia et.al.(Nov 2019)Ms. Pooja Bhatia state or implement result that the prepared sample needs to be moulded quickly before it has a chance to cool down. The initial setting takes place at around 20 minutes and the final setting of the paver block takes place at about 4 hours.
- 10) B. Shanmugavalli et.al.(Feb 2017) Mr. B. Shanmugavalli was conclude that the utilization of waste plastic in production of paver block has productive way of disposal of plastic waste. Paver block made using plastic waste, quarry dust, coarse aggregate and ceramic waste have shown better result.
- 11) Byung-Hyun Ryu et.al.(7 Aug 2020) Mr. Byung-Hyun Ryu cover the point that cost of RPA blocks is lower than that of other permeable paving systems, with reduced maintenance requirements. RPA blocks thus have high potential for sustainable use in pervious paving, with competitive engineering performance and economic feasibility.
- 12) Dinesh Sellakutty et.al.(January 2016) Mr. Dinesh Sellakutty conclude that method is suitable for the countries which has the difficult 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.

III. CONCLUSION

From above discussion and study of all literature review and implementing proper methodology we can justify that plastic paving blocks are will more reliable , flexible , durable , suitable than the concrete paving blocks. We can also estimate that plastic paving blocks are also reliable than the concrete paving blocks. We can also show that the plastic paving blocks will be more durable and flexible after adding abstract of coconut into it.

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