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A Survey on Design of Pavement Blocks Made from Waste of Plastic, Glass & Aluminum Foil

Shivam Ghundare[1], Shubham Giri[2], Diguraj Ingale[3], Akshay Bolbhat[4], Prof. Shreedhar Patil[5]
[1, 2, 3, 4]*Students,* [5]*Professor, Department of Civil Engineering, DR. DY Patil School of Engineering & Technology, Lohegaon, Pune, Maharashtra, India*

Abstract: ***The aim of the project is to recycle the plastic waste into a paver block and to reduce the cost of the paver block when compared to that of a convention concrete paver block. Plastic waste has become a major problem these days. As plastic is non bio degradable material it blocks drains, pollutes rivers and wreaks havoc on the environment. At present nearly 56lakhs tones of plastic waste is produced in India per year.***
As the degradation of the plastic waste is a very slow process so here is an idea of mixing sand into melted salvaged plastic to make a solid, durable material as a paving slab. Hence, we have a "eco-friendly" paving block. Unlike other processes of making porous blocks, which usually involve incineration to burn combustible materials in order to form pores with implication of high carbon emission, the proposed process is non-destructive in that the blocks are merely baked at low temperature, sufficient to melt the waste plastic that gets diffused within the body of the blocks.
The compressive strengths after addition of waste plastic are same as normal block strength. And also reduce the water absorption capacity of block is reduced compare with nominal block. Efflorescence values were low than the normal block. The blocks are likely to add energy efficiency in buildings and help create economic value to manufacturers, thereby, encouraging the ecosystem of plastic waste management involving all actors in the value chain. A mathematical model is developed to predict compressive strength of blocks at varying plastic contents. The study introduces a new strand of research on sustainable thermoplastic waste management.
Keywords: Plastic waste, plastic pavement block, eco-friendly paver block, aluminum foil, glass waste

I. INTRODUCTION

Plastic waste is a non-biodegradable waste which cannot decompose and this creates water, land pollution and air pollution. Also, while we burn the plastic waste in Dumping Ground, the percentage of plastic waste is increasing rapidly. It is estimated that the plastic waste will double after a decade as we use hundreds of Trades of plastic in our daily life. We can recycle, reuse the plastic waste. As a civil engineer we have to innovate something new related to this, which is a boon or civil engineering. So, here we try to do something innovative as PLASTIC SAND BLOCKS.

PLASTIC: "Plastic is a wide range of synthetic (or) semi-synthetic organic solid material suitable for the manufacturing industrial products". • Plastic are polymers of high molecular weight. • Plastic includes materials composed of various elements such as carbon dioxide, hydrogen, oxygen, nitrogen, chlorine and Sulphur.

WASTE GLASS: "Glass makes up a large component of household and industrial waste due to its weight and density."

The glass component in municipal waste is usually made up of bottles, broken glassware, light bulbs and other items. Adding to this waste is the fact that many manual methods of creating glass objects have a defect rate of around forty percent. Glass recycling uses less energy than manufacturing glass from sand, lime and soda.

ALUMINIUM FOIL: "Aluminium is the third most abundant element and most abundant metal in the Earth's crust. It is concentrated in a number of high grades, natural bauxite deposits. Because of its low density, high tensile strength and resistance to corrosion, aluminium is widely used for the manufacturing of aluminium foils."

II. SCOPE OF PROJECT

The original scope of this research is the plastic blocks give us hope and a way to work on innovative things related to the plastic and to try to invent some new civil engineering material which shows some remarkable response in future industry. By using such type of blocks, it can help to reduce pollution to some extent

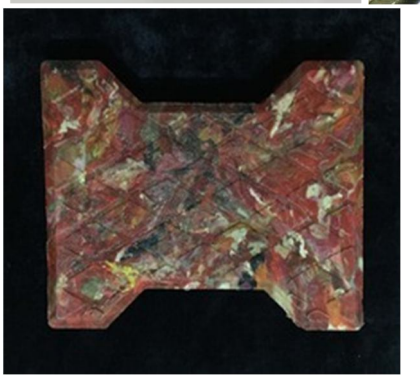
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III. METHODOLOGY

1) Collection of raw material: It include a collection of basic materials to be used such as sand, cement, melted plastic waste, aluminum foil waste, waste glass.
2) Cutting and breaking aluminum foil waste and glass waste respectively
3) Cutting plastic waste in predefined manner
4) Melting the plastic waste under the burner
5) Mixing the sand and aluminum foil in the melted plastic
6) Adding breaked waste glass in the above material
7) Moulding
8) Curing of paver blocks.



IV. DESIGN PARAMETER & TESTING

1) *Water Absorption (IS 15658: 2006):* The molded samples will be soaked in water for 24 h and dried in an oven and air dried for another 24 h. In both the cases, the water absorption is determined.
2) *Setting Time (IS 4031: Part V- 1988):* Initial setting time is the time at which needle fails to penetrate the plastic paste, which is placed in Vicat apparatus to a point 5.0 mm measured from the bottom of the mold. Final setting time is the time required by the needle to make an impression on the top of the plastic block.
3) *Compression (IS 15658: 2006):* Plastic paver blocks were placed in compression testing machine (CTM). The compressive strength is obtained is compared with conventional cement paver block.
4) *Abrasion (IS 2386: Part IV – 1963):* Los Angeles abrasion test is usually conducted to find the toughness and the abrasion character of the paver block.
5) *Hardness (IS 1500: 2005):* Brinell hardness test was conducted to measure the indentation of the samples.

V. ADVANTAGES

A. Allow recycling of waste plastic.
B. They should be sufficiently economical, with potential for easy recycling. Under submerged conditions they should last much longer.
C. Exotic shapes are possible for decorative purposes.
D. Overall cost of paver blocks will be reduced.

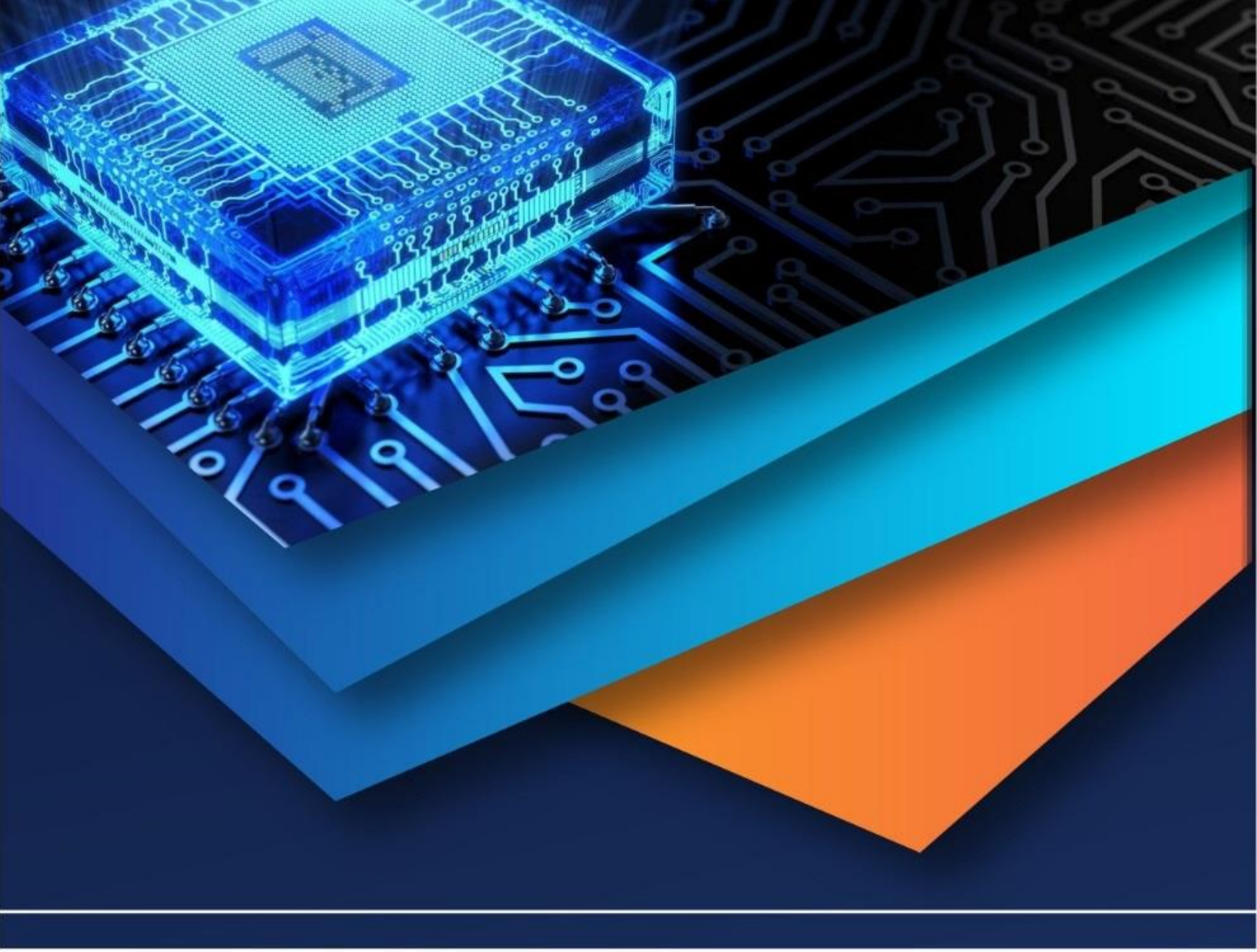
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VI. CONCLUSION

A. A good quality of paver block from cheap raw material can be achieved.
B. 1t will be the effective method to reduce waste.
C. 1t is expected that paver block will be lighter than conventional paver block.
D. Use of Aluminum foil in composition will show moderate increase in compressive strength as compare to conventional paver blocks.
E. The use of waste glass as fine aggregate decreases the unit weight of concrete. With increase in waste glass content, percentage water absorption decreases.
F. Cost of paving blocks is decreases with increase in glass content.
G. Use of melted plastic waste can replace cement content as compare to conventional paver blocks.

REFERENCES

[1] Alaa .A.Shakir, sivkumar naĀnathan, kamal Mustapha, “Development Oÿ Paver blocks From Waste Material.”Australian Journal Oÿ Basic And Applied Science.Jan.2013.Volume.7(8).ISSN 1991-8178.PaĀe No.812-818
[2] Dinesh.S.Irubakaran.K,“Utilization Oÿ Waste Plastic In ManuÿacturinĀ Oÿ Paver blocks And Paver blocks.”IJAER.Jan 16.Volume 11(3).ISSN 0973-4562.PaĀe No.364-368
[3] Pravin GadlinĀ, Mahavir Balmukund Verma, “Comparative Study On Fly Ash Paver blocks And Normal Clay Paver blocks.”IJSRD.Jan16.Volume.4(9).ISSN 2321- 0613. PaĀe No.673-676
[4] Rihan Maaze, Vinod Kumar, Sandip Kumar Mishra, “Influence Oÿ Marble And Aluminum Waste Powder On The Perÿormance Oÿ Paver blocks.” IJEDAR, Volume No 4, Issue no 2, 2016, ISSN 2321-9939, www.ijedr.orĀ (PĀ. No .907-912)
[5] Sina Safinia, Amani Alkalbani, “Use Oÿ Recycled Plastic Water Bottles In Concrete Paver blocks.” Creative Construction Conÿerence 2016. June2016. PaĀe No. 214-221
[6] Arwind Singhal, Dr.Omprakash Netula, “Utilization of Plastic Waste in Manufacturing of Plastic Sand Paver blocks.” ICNFESMH, JUNE 2018, ISBN 978-93-87433-29-8, www.researchgate.net (Pg. No 207-210)
[7] Rajarapu Bhushaiah, Shaikh Mohammad, D.Sriniwasa Rao, “Study of Plastic Paver blocks Made From Plastic.” IRJET, Volume No6, Issue 4, April 2019, e-ISSN 2395-0056, pISSN 2395-0072, www.irjet.net (Pg. No 1122-1127)



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