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Utilization of Waste Plastic in Manufacturing of Plastic–Sand Tiles

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ABSTRACT

There has been a considerable imbalance between the availability of conventional building materials and their demand in the recent past. On the other hand the disposal of plastic (PPCP, PP, etc.) is the biggest challenge as repeated recycling poses a potential danger to the environment. And also a small proportion of plastic products are being recycled. In this work an attempt has been made to utilize this plastic waste to make tiles along with sand. The tiles are been made using plastic and sandin 3:2 ratio. The tiles manufactured possess negligible water absorption and satisfactory compressive strength in comparison with normal tiles.

Keywords: Polypropylene (PP),Polypropylene co polymer(PPCP), plastic and sand

I. INTRODUCTION

The increasing plastic waste causes a lot of threat to the environment and even repeated recycling pose a potential danger. This waste plastic can be reused to make tiles that can be used in floorings for houses, terraces and bathroom.

Polypropylene co polymer(PPCP) is a colorless solid in granular form with no odor .It is non-reactive with environment .PPCP is widely used in Plastic Processing Industries to make a variety of products such as sheets ,boxes, containers, home ware ,brushes ,combs ,etc. PPCP is a non-hazardous material and its overexposure by short term or long term doesn't cause any harmful health effect.

II: THEORY

Plastic is a non-decaying and non-biodegradable material which has led to accumulation of large amount of plastic waste which will never be decomposed. In this work we have used a plastic from household waste in order to make tiles. Sand has been added to it to increase its strength and durability.

The mixture of plastic and sand in the ratio of 3:2is taken in a mold made of china clay.Then itis kept in an oven.The oven is adjusted to a temperature of about 250^{o}C. The mixture is then kept for 15-20 minutes in the oven. The molten mixture is used to make tiles. The mixture is then removed from the oven and then allowed to cool for a few minutes.

Later, in order to verify whether the plastic tiles are able to withstand high atmospheric temperature, it is put in water heated till 50-60^{o}C. Then the tile was removed. There were no signs of softened plastic observed. This confirmed that the tiles can also be used for terrace as it can withstand the sunlight easily.

The tiles can be used for flooring due to their high durability and strength. The plastic will not cause any harm to the environment or life in any form. Also various textures can be given to the tiles which also look to be attractive.

Also we can use sawdust, soil, etc. in order to increase the strength of tiles. Later we can also use cow dung, which is an insulator and would prohibit the heating of the tiles. Thus the tiles would remain cool in intense sunlight thus making walking over it easier and comfortable.

III: FIGURES AND TABLE

Properties of PPCP

Density (kg/m^3)	**905**
Tensile strength (Mpa)	**25**
Tensile Modulus (Gpa)	**1**
Elongation at break (%)	**300**
Melting temperature (^{o}C)	**210-290**

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IV: CONCLUSION

Plastic and sand tile possess more advantage which include cost efficiency, resource efficiency, reduction in emission of greenhouse gases etc. Plastic sand tile can also be known as 'Eco-Tile' made of plastic waste which is otherwise harmful to all living organisms can be used for construction purposes. It increases the compressive strength when compared to normal tiles.

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