JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Waste Material Tile

[1]Dharmendra Kumar [2]Chirodeep Chakraborty,[3]Shashank Shrivastava[4]Rajat Pal ,[5]Mohd.Salman

[1]Sr. Leturer,[2]student,[3]Student,[4]student,[5]Student,
Civil Engineering Department,
[1]IIMT College Of Polytechnic, Greater Noida, India

Abstract: An environmentally friendly approach to the disposal of waste materials, a difficult issue to cope with in today's world, would only be possible through a useful recycling process. Floor tile waste aggregates (FTWA) in concrete applications can substantially reduce the negative environmental effects and exhaustion of the natural resources. In order to reuse and so to reduce the volume of the waste which occurs during the production of waste material of tiles, it is possible to use as aggregates in the production of concrete. In this study, the mechanical and physical properties of concrete produced from floor tile waste aggregates were investigated. C30/37 quality concrete was produced by using two different floor tile wastes.

The properties of these concretes were compared to produce reference concrete. These results of the tests show that the concrete produced from floor tile waste has some more better physical and mechanical characteristics than conventional concrete, thus a new application area to selective recycling of ceramic floor tile waste and its use in the production of concrete.

I. INTRODUCTION

[1]. in 2016, the annual global municipal solid waste generation reached 2.01 billion tones, and it will rise to 3.40 billion tones by 2050 if all conditions remain the same. The same report from the World Bank also indicates that more than 33% of waste is mismanaged, and only 13.5 % of waste has been recycled globally.

[2]. Moreover, the erroneous disposal methods adopted by developing countries in handling wastes can potentially cause severe heavy metal pollution to the ecosystem and result in adverse health impacts on the urban and aquatic life .

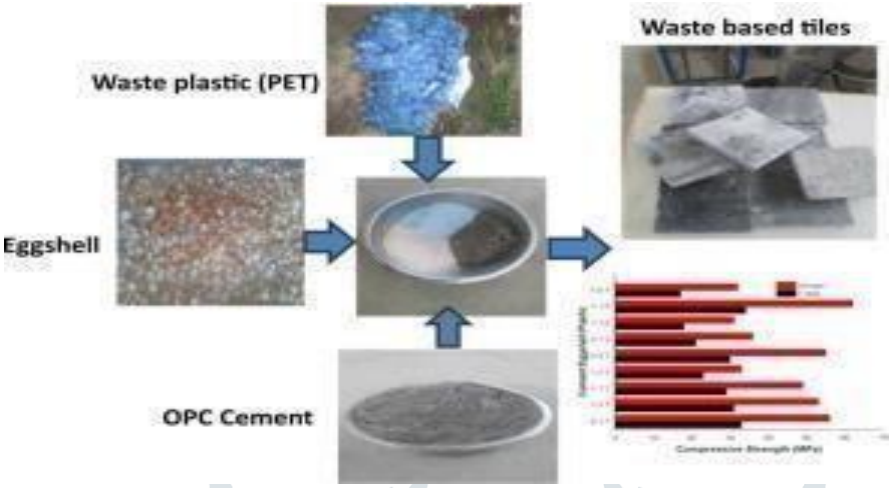
[3]. Additionally, waste materials vary greatly, and the subsequent impact of each type of waste on environmental toxicity requires a case by case investigation. As natural resources are depleting and climate change by gas emissions and environmental contaminations are increasing, many researchers are focusing on recycling waste materials in construction materials with promising results. Ceramic tiles are considered to be a heterogeneous productthat can be manufactured with the addition of waste materials.
Technological innovations in the ceramic tile manufacturing industry involve the development of novel ceramic products, one being porcelain tiles. The development of unique ceramic products has significant advancements in technical performance and aestheticappearance

[4]. Research confirmed the modern ceramic products exhibit high tolerance in its composition, suggesting the potential to recycle waste materials without compensating for the overall quality and even encapsulate heavy metals through sintering process where different particles fused together to become a new piece

METHODOLOGY

Technical field

The method that waste resource recovery in a kind of Production of Ceramics process utilizes the present invention relates to a kind of comprehensive utilization of inorganic materials, with the useless powder in the Production of Ceramics process, useless base, useless brick recycling, production loss on ignition 5%-7%, shrinking percentage 0.5%- 1.0%,



RESULTS

Water Absorption Test:

Sr No.	Test	Test Result For Different Percentage Of Waste Plastic			Normal Cement Tile
		40%	50%	60%	
1	Water Absorption	1.90%	1.73%	1.10%	8.70%

Abrasion Resistance (Average Loss in Thickness in cm):

Sr No.	Test	Test Result For Different Percentage Of Waste Plastic			Normal Cement Tile
		40%	50%	60%	
1	Abrasion Resistance (Average loss in Thickness cm)	0.82 cm	0.72 cm	0.24 cm	0.79 cm

Flexure Test:

Sr No.	Test	Test Result For Different Percentage Of Waste Plastic			Normal Cement Tile
		40%	50%	60%	
1	Flexure Test	195.69 N	228.61 N	258.27 N	244.30 N

DISCUSSION AND CONCLUSION

As shown above, recycling of different wastes in ceramic tiles shows the ability to enhance some properties of ceramic tiles. Still, at the same time, the other properties might be compensated due to the addition of wastes.

In addition, most studies did not apply glazing or use fluxing agents like feldspar as they are commonly used in the industry and have shown the ability to improve the performance further. Moreover, many journal articles did not reveal the process of manufacture or did not set a control ceramic tile to compare with experimental tiles. This brought some difficulty to compared with the properties of commercial tiles directly as the formula may not be able to produce qualified tiles.

Many research studies have discovered that some factors can influence the properties critically. One is the firing temperature; many studies show that waste sample tiles appear to have better performance when firing at a higher temperature of the selected firing temperature range.

However, if the temperature is over or below the optimal temperature range, inferior performance will occur. A suitable range of firing temperature needs to be determined, such as using XRD to determine the composition of waste material.

The second factor is the differences in materials. Waste materials or raw materials of ceramic tile may have different chemical or mineralogical compositions if the acquired location is different.

REFERENCES

[1] Nwachukwu M.A., Ronald M., and Feng H. Global capacity, potentials and trends of solidwaste research and management, Waste Management & Research.
2017, 35(9), 923- 934.

[2] Kaza S., Yao L., Bhada-Tata P., and Van Woerden F. What a Waste 2. 0 : A Global Snapshot of Solid Waste Management To 2050, World Bank Publications, Washington, D. C.,UNITED STATES, 2018, .

[3] Ferronato N. and Torretta V. Waste Mismanagement in Developing Countries: A Review of Global Issues, International journal of environmental research and public health. 2019, 16(6), 1060.

[4] Dondi M., Raimondo M., and Zanelli C. Clays and bodies for ceramic tiles: Reappraisal and technological classification.