

## Recycle of Post Consumer Plastic Waste Into Tiles

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**ABSTRACT:** As fine aggregate replacement on the compressive strength, split tensile strength and modulus of elasticity of concrete having mix proportions of M 20 grade was investigated. Fine aggregates were replaced with six percentages of foundry sand. The percentages of replacements were 0% , 10%, 20%, 30%, 40% and 50% by weight of fine aggregate. Tests were performed for compressive strength, split tensile strength Metal foundries use large amounts of the metal casting process. Foundries successfully recycle and reuse the sand many times in a foundry and the remaining sand that is termed as foundry sand is removed from foundry. This study presents the information about the civil engineering applications of foundry sand, which is technically sound and is environmentally safe. Use of foundry sand in various engineer applications can solve the problem of disposal of foundry sand and other purposes. Foundry sand consists primarily of silica sand, coated with a thin film of bunt carbon, residual binder (bentonite, sea coal, resins) and dust. Foundry sand can be used in concrete to improve its strength and other durability factors. Foundry Sand can be used as a partial replacement of cement or as a partial replacement of fine aggregates or total replacement of fine aggregate and as supplementary addition to achieve different properties of concrete. In the present study, effect of foundry sand and modulus of elasticity for all replacement levels of foundry sand at different curing periods (7-days & 28- days).

Test results showed that there is some increase in compressive strength, split tensile strength and modulus of elasticity after replacing the fine aggregates with certain percentage of foundry sand so foundry sand can be safely used in concrete for durability and strength purposes.

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### I. Introduction

Post-consumer waste is a waste type produced by the end consumer of a material stream; that is, where the waste-producing used did not involve the production of another product. The terms of pre-consumer and post-consumer recycled materials are not defined in ISO standard number 14021 (1999), but pre-consumer and post-consumer materials are. These definitions are the most widely recognized and verified definitions as used by manufacturers and procurement officers worldwide. Quite commonly, it is simply the waste that individuals routinely discard, either in a waste receptacle or a dump, or by littering, incinerating, pouring down the drain, or washing into the gutter. Post-consumer waste is distinguished from pre-consumer waste, which is the reintroduction of manufacturing scrap (such as trimmings from paper production, defective aluminum cans, etc.) back into the manufacturing process. Pre-consumer waste is commonly used in manufacturing industries, and is often not considered recycling in the traditional sense.

## II. Literature review

No.	Paper Title	Author Name	Year of publication	Conclusion
1.	Recycling of plastic waste into tiles with reduced flammability and Improves tensile strength.	Saroj Kumari	22/2/23	The composite tiles fabricated put forward newer approach for reutilization of waste plastic material in our day to day life & industry in an environmentally friendly and economical way .They can be use to build a structure which will be light weight, resistant to corrosion, chemically resistant, low cost of production , increased service life & most importantly put into use what is the menace for society plastic waste.
2.	Production of plastic tiles and its testing	Amit Avinash Kadam/Aditi Sonawane	5/5/2021	As above project studied that the flexural test and abrasion test on plastic tiles gives Good result as compare to Mangalore tiles. Therefore, plastic tiles are more suitable than Mangalore tiles. Plastic is harmful for environment and very much amount plastic waste discard in surrounding in daily routing. So, we trying to minimize and utilize this plastic waste in civil Construction field by manufacturing of plastic tiles with waste plastic material. We trying to best to do efficient task from this material but presently this tough task to us because of uneconomical production of this tiles. Other chemicals such as polyester or other can be used as a binding material which can be more economical in future.
3.	Comparative analysis of tiles made from recyclable LDPE Plastic wastes	Archit hardikar ,omkar borhade ,swapnil wagholikar	2/2/2019	In cutting and finishing. Manufactured tile floats on water, making it suitable for marine applications like rafts, floats A completely recycled product was manufactured at a very cheap price. The strength of the LDPE tile (2176 N) was found to be equally comparable to the strength of ceramic tile (2200 N). The material is unbreakable as against ceramic tile. The static friction factor is better than the available product making it suitable for anti- friction tile fittings. Manufactured tiles have good machinability.
4.	Method of making composite tiles containing waste plastic	Athos Poldidor	2/4/2019	The present invention concerns a manufacturing process and a related product constituted of a tile in plastic material. The process comprises the following operative stages crushing a thermoplastic material of recovery. Athanas Konin "USE OF PLASTIC WASTES BINDING MATERIAL IN THE MANUFACTURE OF TILES: CASE OF WASTES WITH A BASIC OF POLYPROPYLENE " According to konin the plastic waste tiles have low porosity hence it makes tiles impervious in opposition to micro-concrete tiles. The proportion of 40% of plastic binder gives best result hence gauging is to be used.

## III. Methodology

**Collect:** First of all you need plastics. If you want to make a product from recycled plastics, make sure you save all your plastic bottles, caps, buckets and more. Instead of throwing it away, make sure to keep it all together. There are many different types of plastics, which all melt on a different temperature. The best is to use plastics from the same melting temperature. The plastic which could be used best for the plastic tile is HDPE, this is worldwide one of the most used plastics and easy to find. Next to this it is strong, though, easy to melt, and non-toxic.

**Washing:** It is very important to clean the plastic before use. When there are still solvents attached to the plastic, these solvents and impurities will cause problems in the melting by creating excess smoke and will prevent the plastic from sticking to each other.

**Cutting:** After collecting all the leftover plastic, the next step is to cut it all into small pieces. Small pieces will melt easier and it helps with being able to get all the plastic into the the right shape before melting. Cutting could be done by hand or you could use ashredder or an food processor. To cut the plastics into smaller pieces.

**Draw Shape:** We are now making a tile for in the street which will replace an existing stone tile. Because of this we are using a 30x30 cm mold. The thickness will be 4 cm. The best is to create a side wall a bit higher than the thickness you want to be sure the plastic does not go over the edge. Draw the shape on paper and calculate the right measurements.

**Mould:** These mould are made up of wood with all even sides and surface for better finish. The wooden mould are economical and cost effective and suits for any kind of purpose. Size of the mould is (240mmX120mmX240mm) & (240mmX240mmX240mm) temporary.



**Melting :** Before moulding process firstly we have arranged the setup as you can see in (fig.no. 3.6) The bricks are placed I 3 sides to keep the utensil (Dia of 32cm) on it And then the firewood is ignited. The hole point of setting it up is to make a replica of hot air oven. After the preheating of the utensil , plastic is put into in and allowed it to melt to a certain consistency.



#### IV. Conclusion

As above project studied that the plastic is harmful for environment and very much amount plastic waste discard in surrounding indaily routing. So, we try to minimize as well as utilization of this plastic waste in civil construction field by production of plastic tiles with waste plastic material. We trying to best to do efficient tiles form these materials but presently this tough task to us becauseof uneconomical production of this tiles it is possible to use another chemical for binding material such as polyester or other which may be economical in future.

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