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Plastic Brick by Using Plastic Waste and Crush Sand – A Review

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ABSTRACT: The exponential growth in plastic usage has resulted in an increase in plastic waste, a non-biodegradable pollutant that severely impacts ecosystems. As an alternative to traditional waste disposal methods, this study proposes a method to reuse plastic waste by manufacturing plastic bricks using melted plastic and crush sand. These bricks are tested for compressive strength, water absorption, and physical durability. The results demonstrate significant promise for plastic bricks as a sustainable, low-cost alternative to conventional bricks in non-load bearing construction.

KEYWORDS: Plastic Waste, Crush Sand, Plastic Bricks, Eco-Friendly Construction, Waste Management, Compressive Strength

I. INTRODUCTION

Plastic is very common material that is now widely used by everybody in the world. Plastic plays a predominant role in reusable in this era, as it is compact and light in weight. Common plastic items that are used are covers, bottles and food package. The great problems with plastic is its decomposition. Plastic is made of polymer chemicals and they are non-biodegradable. This means that plastic will not decompose when it is placed in earth. Though plastic is a very useful material that is flexible, robust and rigid they become waste after their use and they pollute the air and land. Recycling is processing use waste material into new product to prevent waste of potentially useful material. The increase in the popularity of using eco-friendly, low cost and lightweight construction materials in building in ry has brought about the need to investigate how this can be achieved by benefiting to the environment as well as maintaining the material requirements and their standards. From the advantages of plastic recycling procedure is used.

For the production of plastic brick is an optimal method for controlling the problem by decomposition of plastic waste and also it cost economical for the production of building materials. In this study, plastic waste from factories will be used to incorporate with crush sand bricks. The bricks will then be tested to study the compressive strength,

efflorescence in the recent past research, the replacement and addition have been done with the direct inclusion of polyethylene, polyethylene terephthalate (PET) bottles in shredded from, chemically treated polyethylene-fiber, in small particles from by replacing natural crush sand. Most of replacement have been done by volume calculation, and showed the decreased in compressive strength as the increased plastic wast.

II. PLASTIC BRICK TECHNOLOGY

Plastic bricks are manufactured by heating plastic waste (such as HDPE, LDPE, PET) to $90-130^{\circ}$ C, mixing it with crush sand, molding it, and allowing it to set. The typical proportion used is 3 with 30%. Plastic and dust Molds used are of size 190mm × 90mm × 90mm. These bricks exhibit high compressive strength, zero water absorption, and good surface finish

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III. LITERATURE REVIEW

- Maneeth P. D. et al. (2014): Found that increasing bitumen with plastic and soil increases compressive strength up to 5%, with optimum at 2%.
- Rajarapu Bhushaiah et al. (2019): Achieved 5.6 N/mm² compressive strength; emphasized zero water absorption.
- Siti A. Wahid et al. (2014): Showed that increasing plastic reduces compressive strength but keeps water absorption low; suggested use in partition walls and pavement.
- Mudigonda H. Kumar et al. (2022): Reported compressive strength up to 11.12 N/mm² and water absorption below 1%, recommending plastic bricks as clay brick alternatives.

IV. METHODOLOGY

- 1. Material Collection: Factory-sourced plastic waste and manufactured crush sand.
- 2. Melting & Mixing: Plastic heated to 90–130°C and mixed with sand.
- 3. Molding: Mixture placed in oiled wooden molds and tamped.
- 4. Testing: tested for shape, strength, and absorption.

V. RESULTS

- Compressive Strength: Highest value recorded was 11.12 N/mm2, higher than conventional bricks.
- Water Absorption: Zero absorption recorded.
- Shape & Hardness: Good surface finish and high resistance to scratches.
- Soundness: Indicated strong internal bonding.

VI. COMPARISON WITH CLAY BRICKS

Property	Clay Brick	Plastic Brick
Water Absorption	12%-15%	0%
Weight	2.6-3.5 kg	2.5 – 3.0 kg
Strength	10 N/mm ²	11.12 N/mm ²
		(max)
Cost(approximate)	Rs. 10	Rs. 7



Fig:- Plastic And Crush Sand Brick

VII. CONCLUSION

The study proves that plastic waste combined with crush sand can be used effectively to manufacture plastic bricks with good compressive strength and zero water absorption. This innovation can help reduce plastic pollution and produce affordable, eco-friendly construction materials.

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VIII. FUTURE SCOPE

- Development of hollow bricks, tiles, and lightweight panels.
- Use in waterproof concrete, modular construction, and green infrastructure.
- Investigation of plastic waste additives to improve bonding and structural integrity.

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