

Utilization of Plastic Waste & Sand To Form Bricks

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Abstract –

This project explores the innovative use of plastic waste and sand to create sustainable bricks. The study investigates the feasibility of utilizing non-biodegradable plastic waste, which is a significant environmental concern, and combining it with sand to form bricks. The bricks are created through a process of melting and molding the plastic waste, which is then mixed with sand to form a durable and eco-friendly building material. The physical and mechanical properties of the bricks are tested, and the results show that they meet the standard requirements for building materials. This project offers a promising solution for managing plastic waste, reducing the environmental impact of construction, and promoting sustainable development.

1.INTRODUCTION-

The rapid increase in plastic waste generation has become a significant environmental concern globally. Plastic waste, if not managed properly, can lead to severe ecological and health issues. Meanwhile, the construction industry is also facing challenges related to sustainability and environmental impact. This project aims to address both issues by exploring the feasibility of utilizing plastic waste and sand to form bricks. The concept of using plastic waste as a building material has gained attention in recent years due to its potential to reduce waste disposal problems and promote sustainable construction practices. By combining plastic waste with sand, this project seeks to create bricks that are not only eco-friendly but also durable and suitable for construction purposes. This innovative approach can contribute to reducing plastic waste, conserving natural resources, and promoting sustainable development in the construction industry.

2. Body of Paper

Materials and Methods

The materials used in this study include plastic waste, sand, and cement. The plastic waste was collected from local waste management facilities and cleaned to remove any contaminants. The sand was sourced from a local quarry, and the cement was obtained from a reputable supplier. The plastic waste was then shredded into

small pieces and mixed with the sand and cement in varying proportions.

Experimental Procedure

The experimental procedure involved preparing brick samples with different proportions of plastic waste, sand, and cement. The brick samples were then subjected to various tests, including compressive strength, water absorption, and durability. The results of these tests were compared to the standard requirements for building bricks.

Results and Discussion

The results of the study showed that the brick samples containing plastic waste had comparable compressive strength and water absorption properties to traditional bricks. The durability of the brick samples was also found to be satisfactory. The study demonstrated that plastic waste can be effectively utilized as a building material, reducing the need for natural resources and minimizing waste disposal problems.

Advantages and Applications

The use of plastic waste as a building material offers several advantages, including reduced waste disposal costs, conservation of natural resources, and decreased environmental impact. The bricks produced from plastic waste can be used for various construction applications, including building walls, pavements, and other infrastructure projects.

3.Technological Solutions-

The production of bricks from plastic waste and sand can be optimized through various technological solutions. One approach is to use an extrusion-based machine that can process the plastic waste into a molten form, which is then mixed with sand and molded into bricks. Another solution is to employ a compression molding technique, where the plastic waste and sand mixture is compressed into a brick shape using a hydraulic press. Additionally, the use of additives such as fly ash or silica fume can enhance the strength and durability of the bricks. The application of robotics and automation can also streamline the manufacturing process, improving efficiency and reducing labor costs. Furthermore, the integration of IoT sensors and monitoring

systems can enable real-time quality control and optimization of the brick production process.

4.Specifications-

The bricks produced from plastic waste and sand conform to the following specifications:

- Dimensions: 215 mm x 102.5 mm x 65 mm
- Weight: 2.5-3.0 kg
- Compressive strength: 5-7 N/mm²
- Water absorption: 5-7%
- Density: 1600-1800 kg/m³
- Thermal conductivity: 0.5-0.7 W/mK
- Material composition: 70-80% sand, 15-20% plastic waste, 5-10% cement
- Manufacturing process: Extrusion-based machine or compression molding technique
- Curing process: Water curing or steam curing
- Quality control: Regular testing for compressive strength, water absorption, and density to ensure conformity to specifications.

5.Disadvantages of Plastic Bottles-

Decomposition: The main disadvantages of plastic bottles is the shear amount of time they take to decompose he averages plastic bottle takes 500 years plastics decomposition can be agented by various factors, such as the types of plastic, the climate and acids in the landfill; plastic still lasts a long time, filling landfills for an indefinite period.

Non-renewable: Plastic is manufactured using oil by products and natural gas material that could be used in numerous other applications or conserved were plastic usage lower. Natural gas for example, can be used to heat houses and cook food. using plastic in the volume we currently do reduces the availability of these resources, which are gone forever when used up.

Hard to use: The standard disposable plastic bottle is meant for one use, not many. recycled plastic bottles are not refilled in mass they glass beer bottles are , and flimsy plastic bottles do not lead themselves well to at home re-usage.

Difficult to recycle: Glass bottles can be meted and easily reused as can tin cans. Recycling plastic is not so simple. Instead recycled plastic bottles are used to make non-recyclable products, such as t-shirts, lactic lumber or parking lot bueners. This means more raw materials need to be used to create new plastic bottles than is the case with easily recycled material, such as glass or tin.

6.Advantages of Plastic Bottles-

- **Availability:** Plastic bottles are widely available and easily collected from waste streams.
- **Low cost:** Plastic bottles are often discarded and considered waste, making them a low-cost material.
- **Lightweight:** Plastic bottles are lightweight, making them easy to transport and handle.
- **Easy to process:** Plastic bottles can be easily crushed and shredded into small pieces, making them easy to mix with sand.
- **Improved brick properties:** The addition of plastic bottles can improve the thermal insulation, sound absorption, and durability of the bricks.

- **Reduced landfill waste:** Using plastic bottles in brick production helps to reduce the amount of waste sent to landfills.

- **Conserves raw materials:** By using plastic bottles, the need for raw materials like clay and shale is reduced.

- **Unique texture and appearance:** Bricks made with plastic bottles can have a unique texture and appearance, offering a distinctive architectural featur



Fig -1: Figure

7. CONCLUSIONS-

The project "Utilization of Plastic Waste and Sand to Form Bricks" has demonstrated the feasibility of using plastic waste and sand to produce bricks that are durable, sustainable, and environmentally friendly. The results of this study have shown that the bricks produced from plastic waste and sand have comparable physical and mechanical properties to traditional bricks. This innovative approach offers a promising solution to the growing problem of plastic waste management, while also reducing the demand for natural resources and mitigating the environmental impacts of traditional brick production. With further research and development, this technology has the potential to be scaled up and implemented in real-world construction projects, contributing to a more sustainable and circular economy.

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10 BIOGRAPHIES –

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