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Production of Fabrick tiles by using ichalkaranji textile industry waste

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Abstract -

The rapid growth of the textile industry, especially in regions like Ichalkaranji, has led to an increase in textile waste, which poses significant environmental challenges. This project explores the innovative use of textile waste from the Ichalkaranji textile industry for the production of fabric tiles. By utilizing post-production textile waste materials, such as off-cuts, leftover threads, and discarded fabrics, this project aims to provide a sustainable solution to reduce waste and promote eco-friendly alternatives in the construction industry.

The process involves collecting and processing textile waste, followed by its conversion into fabric tiles through a combination of recycling, re-engineering, and bonding technologies. These tiles can be used for various applications, including interior decoration, flooring, and wall cladding. The project also investigates the potential of these fabric tiles to offer properties like durability, sound insulation, and thermal resistance, providing a sustainable and cost-effective building material.

The project focuses on environmental sustainability by minimizing the disposal of textile waste into landfills and reducing the consumption of virgin resources. Additionally, it highlights the economic benefits for the textile industry, creating opportunities for value-added products while promoting a circular economy. Through this research, the production of fabric tiles from textile waste will contribute to both the reduction of waste and the creation of innovative solutions in the green building materials sector.

***Key Words*:(** Textile waste, Fabrick tiles, Recycling, Eco-friendly construction, Waste management, Cost effective materials.)

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Introduction

The growing human population and advancements in technology are highly responsible for high energy consumption, pollution, waste, greenhouse gas generation, and resource depletion. As mentioned by Global Footprint Network in 2018, "if we keep on using resource at current rate, we will need 3 times more of the resources available currently on planet Earth to meet our yearly demands" . The increase in population and living standards has increased the amount of textile waste produced every year. There are several large brick-manufacturing companies that are the primary sources of air pollution in the world. They use trash, tires, textiles, and plastics as fuel. The global textile sector is also the highest-waste-producing sector, amounting to 55% of total global waste. Nowadays, reusing textile waste is an important step that can contribute to environmental sustainability in several countries. Construction is a field that can reuse this waste in the form of bricks. Using this waste in the manufacturing of construction materials can also lead to the minimisation of landfill use and reduce the consumption of natural resources and energy.
The textile industry is the world's second-largest industrial polluter after the oil and petrochemical industry, amounting to 14% of landfill material. The clothing and textile industry is notorious for contributing to environmental degradation, including greenhouse gas emissions and the generation of wastewater and solid waste at various stages of production and along the supply chain.

1. Methodology

- **Waste collection and sorting for project:** The waste collection and sorting process is a critical phase in the production of fabric tiles from textile industry waste.
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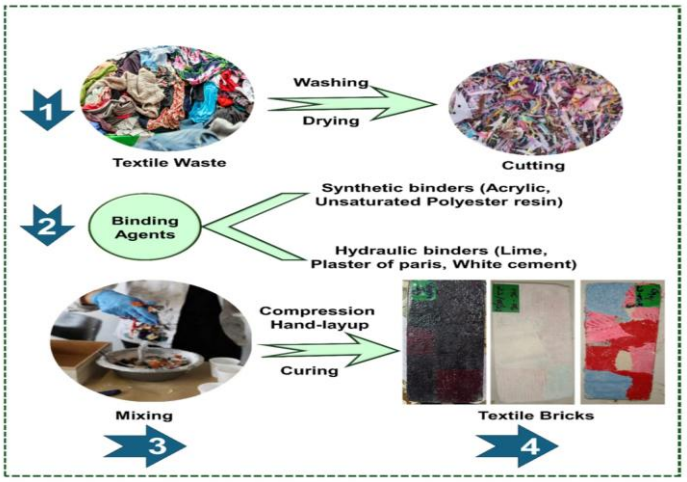
- **Material preparation for making tiles :** The preparation of materials for fabric tile production is a crucial step that ensures the final product is of high quality, durable, and functional.

- **Tile composition and design :** Tile composition and design are fascinating aspects of both interior and exterior architecture.

- **Molding and fabrication of tiles :** Molding and fabrication of tiles involve creating the shapes, textures, and designs of tiles using raw materials. Here's a breakdown of the key steps and processes involved:



Process

1. Collection and Sorting

- Gather textile waste such as cotton, polyester, or other fabric scraps from local industries.
- Sort the waste by material type, ensuring compatibility for processing and durability in the final product.

2. Shredding and Processing

- Shred the fabric scraps into fine fibers or smaller pieces.
- Clean the material to remove dyes, chemicals, or impurities that could affect the final product's performance.

3. Binding and Molding

- Use an adhesive or resin to bind the shredded fabric. Eco-friendly binders like bio-based resins can align with sustainability goals.
- Mix the fabric waste with the binder to create a moldable material.
- Mold the mixture into tile shapes using press molding or casting techniques.

4. Drying and Hardening

- Allow the tiles to dry under controlled conditions to solidify the structure.
- Consider additional heat treatments, if needed, to improve strength and ensure uniformity.

5. Surface Treatment

- Polish, laminate, or coat the tiles for aesthetics and added durability.
- Apply textures, patterns, or even prints to create visually appealing designs.

6. Quality Control and Finishing

- Test the tiles for strength, water resistance, and thermal properties to meet industry standards.
- Trim and finish the edges for a polished look.

- **Project Implementation Plan**

5. Project Implementation Plan

Phase 1*: Waste collection and sorting for project*

- Categorize textile waste by material type (cotton, polyester, blends, etc.).
- Separate recyclable and non-recyclable materials to streamline processing.

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Phase 2: **Material preparation for making tiles :**

 Cotton and other natural fibers that can be repurposed into tiles.

 Synthetic fibers like polyester and nylon that bond well with adhesives or resins.

 Blends that maintain structural integrity after processing.

Phase 3 Tile composition and design

Monochromatic tones for minimalism.

Contrasting or bold colors for standout effects.

Natural hues like earthy browns or greens for an organic feel.

6. Expected Outcomes and Benefits

7.

Producing fabric tiles from Ichalkaranji's textile industry waste offers innovative solutions to both environmental and economic challenges. By repurposing discarded textile materials into durable and aesthetic fabric tiles, the process promotes a circular economy model, reducing waste and minimizing the environmental impact of the textile industry. These tiles could feature unique properties like sound absorption, lightweight construction, or thermal insulation, making them versatile for various applications.

8. Challenges and Mitigation Strategies

Producing fabric tiles from textile industry waste presents several challenges, which can be effectively managed with strategic approaches. One of the primary challenges is the **collection and sorting of waste**, as textile scraps come in varied materials and conditions, requiring significant effort to categorize and clean them. This can be mitigated by partnering with local textile factories to streamline waste collection and implementing automated sorting and cleaning systems. Another challenge lies in **creating a durable, uniform tile material** from fabric scraps. Achieving this requires careful selection of eco-friendly binders and testing different formulations. Continuous research and development can ensure the final product meets industry standards for strength and durability

8 .Conclusion- In conclusion, the production of fabric tiles from Ichalkaranji's textile industry waste represents a promising opportunity to address environmental challenges while fostering economic growth and innovation. By repurposing textile scraps, this initiative not only reduces waste and pollution but also creates a sustainable product with unique aesthetic and functional properties. While challenges such as waste sorting, durability, and market acceptance exist, they can be mitigated through strategic planning, technological innovation, and effective marketing.

9. Future Scope

- The future scope of producing fabric tiles from Ichalkaranji's textile industry waste is expansive and promising.
- As sustainability continues to be a global priority, this initiative could lead to innovations in both the textile and construction industries. Research and development can focus on enhancing the durability, thermal insulation, and acoustic properties of fabric tiles, making them a versatile choice for residential and commercial spaces.
- Expanding the product range to include customized designs and textures could attract.

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