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Creative Ways to Repurpose Textile Waste for Sustainable Interior Design

Vaibhavi Gambhire[1], Jaanvi Sehgal[2], Ar. Sunakshi Shokeen[3]

[1,2]Interior Architecture and Design, World University of Design, Sonipat- HR, 131029, India.

[3]Assistant Professor, World University of Design, Sonipat- HR, 131029, India

Emails: *sakshi.21@wud.ac.in[1], anushkajain.21@wud.ac.in[2], sunakshi.shokeen@wud.ac.in[3]*

Abstract

Every year, the world produces 100 billion garments, generating 92 million tons of textile waste. With 60% of new clothes made from plastic, textile production contributes 42 million tons of plastic waste annually, responsible for 9% of the microplastics polluting our oceans. Traditional design and manufacturing materials have significantly contributed to environmental degradation and resource depletion, prompting the exploration of alternatives that offer a more positive future projection. This research explores the sustainable reuse of textile waste in interior design and construction. The goal is to understand the endurance and performance of these repurposed materials in interior environments by studying various case studies. By integrating recycled fabrics and textile remnants, designers can develop visually appealing, functional interiors that promote resource efficiency and waste reduction. This study examines techniques and case studies, demonstrating how textile waste can be transformed into durable, aesthetically pleasing elements in modern interior design. The findings underscore the potential of textile waste as a valuable resource, providing practical solutions for sustainable interior design practices and contributing to a more environmentally conscious industry.

Keywords: *Environmentally conscious, Interior design, Sustainability, Textile, Waste management*

1. Introduction

The global textile industry generates millions of tons of waste annually, contributing to significant environmental pollution. In India, one of the world's largest textile producers, the challenge of managing textile waste is particularly acute. Traditional disposal methods, such as landfilling and incineration, have proven inadequate and environmentally harmful. As a result, there is a growing interest in sustainable practices that repurpose textile waste, turning it into valuable resources for other industries. This paper explores the innovative use of textile waste in interior design through the Fabrick method. Fabrick is a brand of bricks made from recycled textile waste by French architect Clarisse Merlet. This technique involves compressing textile waste with a binding agent to create durable, brick-like structures that can be used in various interior applications, including partition walls, furniture, and decorative elements. The study examines the feasibility, benefits, and challenges of implementing this method in India, considering its diverse climates and socio-economic contexts. Figure 1 shows the Value Chain of Textile Waste in India. [1-5]

2. Literature Review

2.1. Textile Waste and Environmental Impact

Textile waste is a significant contributor to global pollution, with approximately 92 million tons generated annually worldwide (Ellen MacArthur Foundation, 2017). In India, the problem is exacerbated by a large textile industry that produces substantial waste from both production processes and post-consumer use. The disposal of this waste in landfills and through incineration leads to soil and water contamination, air pollution, and greenhouse gas emissions (Karmakar, 2018).

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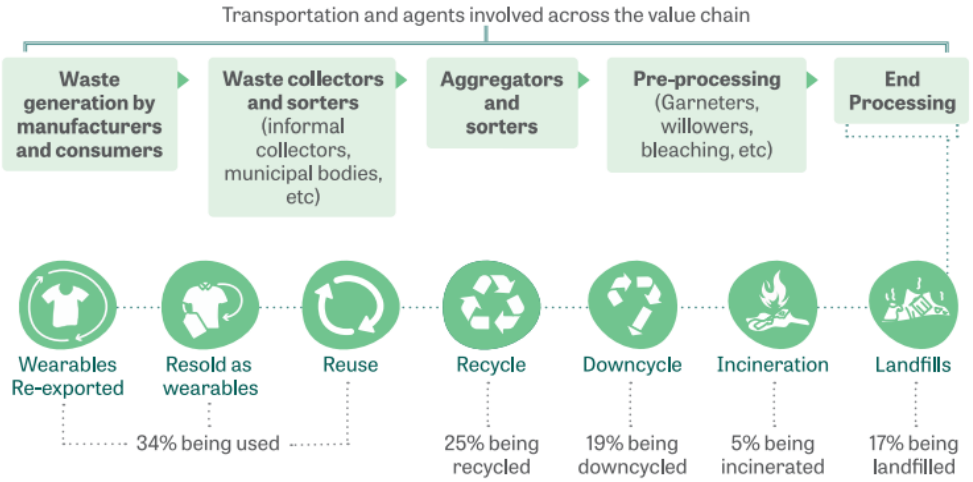

Figure 1 Value Chain of Textile Waste in India

2.2. Current Uses of Textile Waste in Construction and Design

Innovative uses of textile waste in construction and interior design have emerged as a sustainable solution to this problem. Previous studies have explored the use of textile waste in applications such as insulation materials, composites, and even concrete reinforcement (Pappu et al., 2007). The Fabrick method, developed more recently, represents a novel approach by transforming textile waste into aesthetically appealing and functional building materials (Andreu, 2019).

2.3. The Fabrick Method: Process and Potential

Figure 2 Clarisse Merlet, Founder of Fabbrick Demonstrates the Potential of Waste Coming From the Textile Industry

As shown in Figure 2 The Fabrick method involves collecting textile waste, cutting it into smaller pieces, and binding it with a suitable eco-friendly adhesive to create solid blocks or panels. These materials are then pressed and cured to form durable structures. The method has been praised for its ability to repurpose waste while providing unique textures and colours that traditional materials cannot offer (Andreu, 2019). However, its application in different climates, particularly in regions with high humidity or temperature extremes, requires further investigation.

2.4. Applicability in India's Climate and Market

India's diverse climate ranges from hot and humid coastal areas to dry and arid regions, necessitating materials that can withstand varied weather conditions. Additionally, there is a growing market for sustainable materials in India's construction and design sectors, driven by increased awareness of environmental issues and government initiatives promoting green building practices (BEE, 2021). Understanding the adaptability of the Fabrick method in these contexts is crucial for its successful implementation.

3. Methodology

This research employs a mixed-methods approach, combining qualitative and quantitative data collection and analysis:

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- **Literature Review:** A comprehensive review of existing studies on textile waste, sustainable interior design, and the Fabrick method was conducted to establish a theoretical foundation.
- **Case Studies:** An analysis of existing projects utilising the Fabrick method and similar techniques worldwide, focusing on their materials, construction methods, and environmental impact.
- **Material Testing:** Fabrick samples were produced using textile waste collected from Indian textile manufacturers. These samples were tested for durability, moisture resistance, UV stability, and fire safety in laboratory conditions to assess their suitability for different climates.
- **Interviews and Surveys:** Interviews with industry experts, architects, and interior designers were conducted to gather insights into market acceptance and potential challenges. Surveys were distributed to consumers to gauge awareness and willingness to adopt textile waste-based materials.

4. Results and Discussion

4.1. Environmental Benefits of Using Textile Waste in Interior Design

The study found that using textile waste in interior design significantly reduces the environmental footprint of both the textile and construction industries. The Fabrick method offers a way to divert large amounts of waste from landfills, reducing soil and water pollution. Additionally, the process of converting textile waste into Fabricks consumes less energy compared to traditional building materials, leading to a lower carbon footprint.

4.2. Performance of Fabricks in Various Indian Climates

Material testing revealed that Fabricks, when properly treated with water-resistant and UV-protective coatings, can withstand a range of Indian weather conditions. In humid regions, Fabricks exhibited good moisture resistance, provided they were sealed with appropriate coatings. In dry, arid regions, Fabricks showed excellent durability and minimal degradation due to UV exposure. However, in areas with significant temperature fluctuations, additional reinforcement was necessary to prevent material fatigue.

4.3. Economic and Social Impact

The economic analysis indicates that Fabricks can be produced cost-effectively, especially when utilising locally sourced textile waste and labour. The method provides new economic opportunities by creating jobs in textile waste collection, processing, and Fabrick production. Socially, using Fabricks promotes community engagement and awareness around sustainability, as the materials used in these products often come from the local community, creating a direct link between consumption and waste.

4.4. Market Acceptance and Potential Challenges

Interviews and surveys indicated a positive reception toward using textile waste-based materials among architects, designers, and consumers, particularly those interested in sustainability. However, concerns were raised regarding the long-term durability and safety standards of these materials. To overcome these challenges, it is recommended to develop standardised testing and certification processes to ensure Fabricks meet safety and performance requirements. [6-10]

Conclusion

The Fabrick method presents a viable and sustainable solution for repurposing textile waste in interior design. By transforming waste into durable, aesthetically pleasing building materials, this method not only addresses environmental issues but also opens up new economic opportunities and design possibilities. While there are challenges related to material durability and market acceptance, these can be mitigated through research, innovation, and education. Overall, the Fabrick method offers a promising path toward sustainable design and waste management in India and beyond.

Recommendations for Future Research

Future research should focus on:

- Developing advanced materials and binding agents to enhance the durability and weather resistance of Fabricks.
- Exploring large-scale production techniques to make Fabricks more cost-effective.

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- Conducting long-term studies to assess the durability and performance of Fabricks in various environmental conditions.

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