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UPCYCLED WINDOW BLINDS: A SUSTAINABLE ALTERNATIVE FOR HOME DECOR

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ABSTRACT

Newspaper and flex banners are two widely available waste materials, yet they hold significant potential for upcycling into eco-friendly and sustainable products. This study explores the transformation of newspaper and flex banners into functional window blinds, demonstrating an innovative approach to waste management. First Prototype was developed using newspaper along with threads, adhesive and wooden supports. The final product was lightweight, low cost and aesthetically appealing functional blinds. Feedback of 40 subjects were taken for the newspaper blinds, where the model design and the mechanism was highly appreciated. However, there was a concern about the durability, susceptibility to tearing and water resistance. This necessitated the exploration of alternative materials. Hence, the second prototype was developed using waste flex banners as they are waterproof, tear-resistant, and UV-resistant. The resulting flex blinds were visually appealing, sustainable and strong. User feedback confirmed enhancements in durability compared to earlier prototypes.This project underscores the value of sustainability in the home decor industry. It serves as a model for integrating waste materials into innovative and practical applications. The final product developed in the present study can be suitable for diverse settings including homes, offices, schools and commercial spaces.

INTRODUCTION

Waste generation is one of the most pressing environmental challenges at today's time, with materials like newspapers and flex banners contributing significantly to the problem. Waste refers to discarded materials that are no longer useful. In India, where urbanization and consumption are rising rapidly, the improper disposal of newspaper and flex banner waste creates severe ecological and societal concerns.Newspapers, while recyclable, often become waste due to their single-use nature and the lack of efficient recycling systems. India, being one of the largest producers of newspapers, generates approximately 3 million tons annually, out of which about 1.2 million tons end up as waste (Neng Guan, Chuanshuang Hu, Litao Guan, Weiwei Zhan, Hong Yun, and Xiaojing Hu, 2020).

This discarded paper often finds its way to landfills, where it decomposes and releases methane, a potent greenhouse gas. Moreover, the overproduction of newspapers contributes to deforestation, depleting natural resources and threatening biodiversity. Improper recycling or contamination of paper further reduces its utility, exacerbating the problem.Flex banners, made from polyvinyl chloride (PVC) and polyester fabric, are another significant source of non-biodegradable waste. Widely used for advertisements, events, and political campaigns, these banners have a short lifespan and are challenging to recycle due to their composite nature. India generates over 150,000 tons of flex banner waste annually (Appala Naidu Uttaravallia, Srikanta Dindab and Bhanu Radhika Gidla, 2021). Being non-biodegradable, these banners persist in the environment for hundreds of years. When burned, they release harmful toxins like dioxins and furans, which pose serious health and environmental risks. Improper disposal of flex banners also leads to microplastic pollution, contaminating water bodies and entering the food chain.The accumulation of these wastes causes multiple environmental problems. Overburdened landfills, deforestation, air and water pollution, and climate change are just some of the consequences. Addressing this issue requires a multi-faceted approach. For newspapers, promoting digital media, enhancing recycling infrastructure, and encouraging reuse can help reduce waste.

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For flex banners, transitioning to eco-friendly alternatives such as biodegradable or cloth-based materials, enforcing strict regulations, and investing in recycling technologies are critical. Public participation in waste segregation and awareness campaigns is also essential in tackling this growing problem.

The waste generated by newspapers and flex banners in India is a significant environmental concern. By implementing sustainable practices and adopting responsible consumption and disposal habits, we can mitigate the adverse effects of this waste and move towards a cleaner, greener future(Kenan Saatcioglu, Prabhuraj D Venkatraman 2024). This study investigates the conversion of discarded newspapers and flex banners into functional window blinds, showcasing a creative and sustainable solution for effective waste management

METHODOLOGY

The first prototype of the blinds was fabricated using newspapers.

***Preparation of Prototype 1*:** To develop innovative newspaper-based blinds, the project began by sourcing large quantities of newspapers from college campuses and residential areas. This not only contributed to the project's sustainability but also emphasized its eco-friendly aspect.

***Testing*:** To assess the design's effectiveness, feedback was gathered from 40 subjects. An accidental sampling method was adopted to elicit information regarding functionality, aesthetic appeal and durability of the prototypes.

***Preparation of Prototype 2*:** Based of the user feedback survey, recognizing the need to address these issues, the second prototype was developed using waste flex banners as the primary material

RESULTS

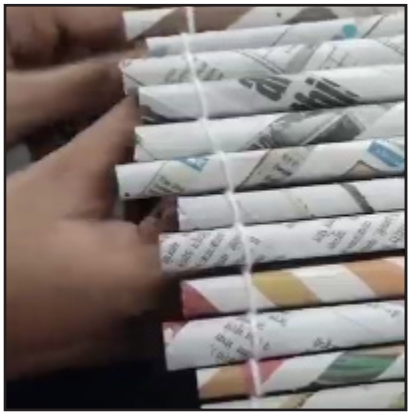
Development of Prototype 1

Process: The manufacturing process began with the careful rolling of individual sheets of newspaper diagonally, ensuring the rolls were tight and uniform in size. Each roll's ends were securely fixed using Fevibond adhesive, a strong bonding agent that provided initial structural stability. Once the rolls were prepared, they were measured to ensure consistent length and uniformity across the entire batch.

Rolling the newspaper diagonally

Assembly: The next step involved weaving the rolls together using wool threads, which were chosen for their flexibility and durability. The wool threads allowed for a more organic, aesthetic texture while ensuring the individual newspaper rolls remained tightly bound. The woven structure was then reinforced with a wooden stick placed at the top, which not only provided additional support and rigidity to the entire blind but also served as a practical mechanism for hanging or adjusting the blinds.

Weaving the rolls together using wool thread. Wooden support at the top



This handmade assembly process, which combined both creative design and functional construction, resulted in a lightweight, cost-effective, and visually appealing product, ideal for use as blind.

First prototype newspaper window blind

User Feedback Survey

The response was generally positive, with particular praise directed at the innovative use of materials and the functional mechanism of the blinds. However, several concerns were raised regarding the blind's durability, as the newspaper was susceptible to tearing, and the blinds lacked water resistance, making them vulnerable to damage from environmental factors.

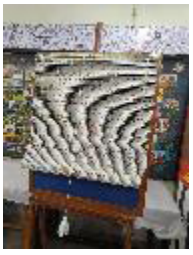
Recognizing the need to address these issues, the second prototype was developed using waste flex banners as the primary material due to the properties like water resistance, tear resistance, and UV stability which was lacking in prototype one. The new product developed flex blinds retained the visual appeal and sustainable ethos of the original prototype while offering significant improvements in strength and durability. The mechanism used in this flex banner is different from the previous prototype. The process begins with fixing the window blind lock set on a wooden ply. The wooden ply is reinforced with a stainless-steel bracket and secured using screws. Once reinforced, the ply is mounted in place, and the flex window blind is carefully attached. The installation is completed by verifying proper alignment and smooth operation. This transition to flex banners not only solved the material-related issues of the first prototype but also strengthened the product's viability for long-term use in a variety of environments.

Weaving the rolls together using nylon thread Lock Set Mechanism

Second prototype: Flex Banner Window Blind

Cost Analysis

The market offers a diverse range of window blinds, catering to various budgets and aesthetic preferences. The following are some of the most popular types of window blinds, distinguished by their price:

Properties	Newspaper window blinds (COST)	Flex banner window blinds (COST)	Fabric window blinds (MRP)	PVC window blinds (MRP)	Wooden window blinds (MRP)
Cost	Affordable  Rs. 200	Affordable  Rs. 1,340	 Moderate Rs. 3,810	 Moderate Rs. 4,799	 Expensive Rs.11,289

CONCLUSION

This project highlights the critical importance of sustainability within the home decor industry, emphasizing the need for eco-friendly and innovative practices in modern design. By repurposing waste materials, the project demonstrates a model for integrating discarded resources into creative, functional, and aesthetically appealing applications. The approach not only addresses environmental concerns by reducing waste but also opens up new opportunities for cost-effective and sustainable design solutions.

The final product newspaper and flex banner window blinds developed through this study are versatile and adaptable, making them suitable for a wide range of applications. These include residential spaces, where it can enhance the aesthetic and functional value of homes; office environments, where sustainable decor can align with corporate sustainability goals; educational institutions, where it can inspire and promote environmental consciousness among students; and commercial spaces, where it can contribute to creating eco-friendly brand identities. This broad applicability underscores the potential of this innovation to impact various sectors, paving the way for a more sustainable future in the home decor and interior design industries.

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