



## ROLE OF PAPER TUBES AS A SUSTAINABLE MATERIAL IN INTERIOR SPACES

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### Abstract:

With increase in importance of sustainability in every field, there is a need for sustainable materials in interiors and architecture industry. Also, it is necessary for advanced and recyclable materials to enhance the human experience as well as to protect the built environment for future generations. Paper tubes have been identified as one of the material for sustainable interior spaces. The study aims to discuss the applicability of paper in a sustainable interior space. To study its feasibility and acceptance among designers and its future scope.

**Key Words:** Paper Tubes, Sustainability, Interior Spaces & Designers

### Introduction:

Materials play a very important role in creating sustainable interiors. "The 21st century has contributed hugely to the evolution of materials, which should be credited mainly to arise of sustainable construction due to rising environmental concerns. "Paper is evolved wood," writes Shigeru Ban, the Pritzker-winning Japanese architect in his book [1]. Ban beautifully incorporates lightweight designs using these sustainable paper-tubes into relief construction and temporary architecture as discussed in [2]. Paper tubes were first used in building disaster shelters in Rwanda, and it helped prevent deforestation due to the previous practice of cutting trees for construction".

These paper tube constructions are modular, which means they can easily be disassembled, moved and reassembled. In case they are no longer needed, they are recycled back to pulp. The tubes are put together with wooden or plastic joints, and in some cases tied in with rope the way bamboo is intertwined in traditional Japanese roof construction. The material gives his structures an earthy feel, making them blend in with their natural environment of light beige, brown and grayish tones, meeting one of the 4Es requirements of Eco design. Despite its durability, paper gives a feeling of impermanence when compared to sturdy materials such as reinforced concrete. Carton structures are elegant, but not imposing nor overbearing for the people who inhabit them. They possess the intimacy of a dwelling, inviting their inhabitants to breathe unto them the spirit of life.



Figure 1: cardboard temporary pavilion made by Shigeru Ban at Abu Dhabi Art Festival. (designindaba.com)

### Objectives of the Study:

- Applicability of paper in a sustainable interior space.
- To explore the acceptability of paper as an interior material.
- To study/analyze the feasibility of paper as an interior material.

### Methodology:

**Question:** Can paper be used as a sustainable material to create different interior elements?

**Type of Research:** This is an experimental as well as observational research in which paper tubes are used in realistic interior spaces to find out the advantages and limitations of the material. It is a qualitative research in which the participant observation is involved and the researcher in the very situation that they are observing. It is a process of naturalistic inquiry that seeks in depth understanding of social phenomena within their natural setting.

**Experiment 1 – Office Interiors:** The first experiment is executed in an office interior space located in Vaishalinagar, Jaipur. The office space is situated in a building with carpet area of approximately 200 sq. ft. Since, this was an architect's office, the idea was to create more of an innovative and unique space rather than a

conventional one to relate with the designer's identity. Here, paper tubes were used as an integral part in the whole design process. It is used in various forms and characterize as a multipurpose material.

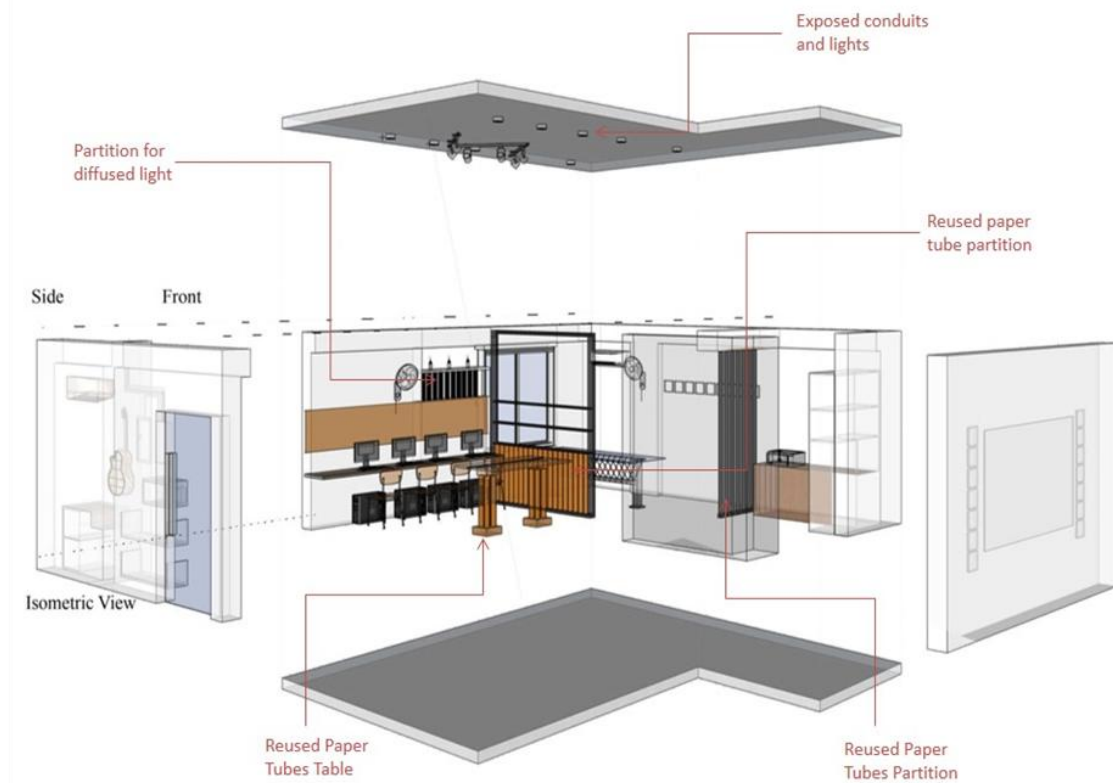


Figure 2: Isometric view of the office interior space located at Vaishalinagar, Jaipur

In figure 2, use of paper tubes in various objects has been shown in the isometric view of the office interior space. The reused paper tubes are used in construction of visual partition, in table legs as well as in windows for restricting direct sunlight. They were left in their raw finish to blend with the surroundings, to give raw and industrial feel to the interiors.



Figure 3: Paper tubes partition



Figure 4: Image of office showing paper tubes used as dividers



Figure 5: View of Discussion table made in paper tubes and ply board



Figure 6: Image of discussion table made in paper tubes and ply board

**Experiment 2 – Photo Studio Interiors:**

The second experiment is executed in a photo studio interior space located in Jhotwara, Jaipur. The carpet area of photo studio is approximately 190 sq.ft. The concept of interior space is to use exposed materials with minimal budget. In this space, an S shaped partition is developed using metal frame and recyclable paper tubes to divide two functional spaces.



Figure 8: Conceptual view of photo studio showing S partition made in mild steel frame and paper tubes

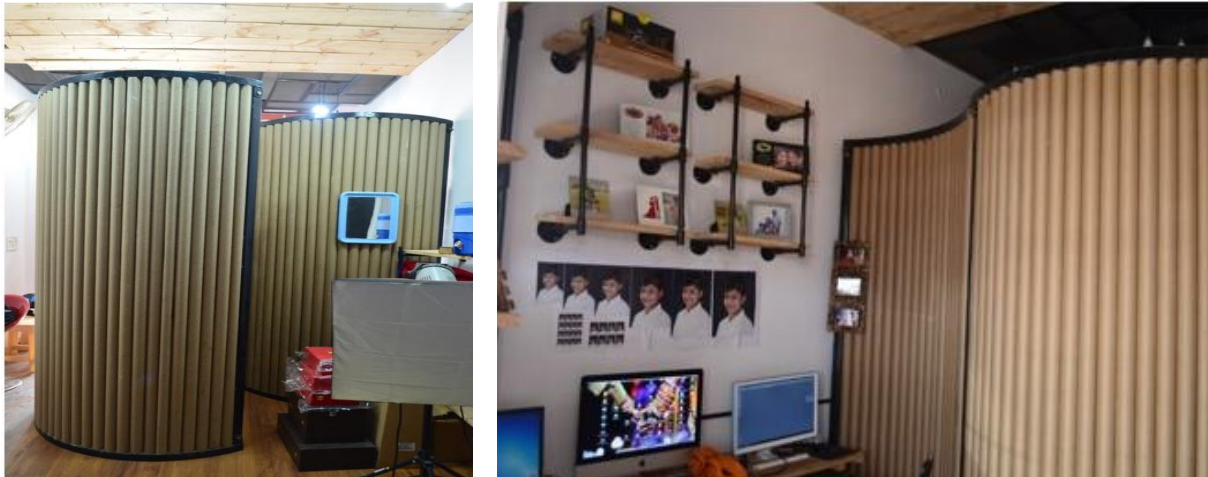


Figure 9: Images of S partition made in mild steel frame and paper tubes

### **Results and Conclusion:**

Interior spaces plays a vital role in human habitation fulfilling the basic needs of survival. Interior design is the art and science of enhancing the human experience functionally and aesthetically. Hence, we need more and more sustainable materials to protect the environment from worst conditions. Due to advancement in technology and awareness among people, a variety of sustainable products has been introduced and gaining popularity in market. Paper tubes are one those materials which can be made easily available and can be used in multiple ways. They come in different categories and can be customized in different lengths, thicknesses, diameter, and color as per the design. They do not require high maintenance and are easy to use. Paper tubes have limitations in water prone areas and places which are highly fire prone. They cannot be bend or twist for organic or curvilinear designs forms. They should go under bending and compression testing before final usage. If properly designed and executed, paper tubes can be a very cost effective material in interior spaces. Therefore, paper tubes can be used as one of the materials to create sustainable interiors. More awareness among people and designers is required to increase its practical implementation.

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