Journal of Advances and Scholarly Researches in Allied Education
Vol. 21, Issue No. 3, April-2024, ISSN 2230-7540

Exploring the use of recycled materials in interior design and their environmental benefits

Prof. Ar. Amol Madhav Bapat*

Professor, Aditya College of Architecture, Mumbai, Maharashtra , India

Email: bapatamol06@gmail.com

Abstract - Sustainable and environmentally friendly interior design practices have grown in popularity in recent years. The field of interior architecture has adopted a fresh perspective in its design process. Consideration of both the user's and the environment's well-being are central to sustainable interior design. Sustainable interior design is discussed in the article, along with the significance and use of certain materials. In addition, examples of completed projects that prioritize environmental friendliness are shown, along with the fundamental principles of sustainable design. As a result of the economy's meteoric rise, "green ecology" has quickly gained widespread acceptance. Investigating and studying the potential uses of biodegradable materials in this setting is worthwhile. The use of biodegradable materials in home decor is the topic of this article. Avoidance, reduction, and reuse are the three main tenets of waste minimization initiatives.

Keywords: Recycle, waste material, Interior Design, Environment

----------X----------

INTRODUCTION

The idea of "recycling" was born out of the idea that a material or product's life cycle might terminate and then begin again. Because it encourages the sustainable use of our natural resources and fosters community development, recycling helps reduce pollution, conserves energy, and lessens the effects of greenhouse gases; it also helps save new land use, which is especially important in developing countries like Albania, where pollution is rampant. Because recycled materials and facilities not only have less prices but also provide more work prospects, I could not leave out the economic effect. Recycling and reusing building materials would lessen the environmental impact of concrete and have many other positive effects. Although people appreciate the higher quality of life that top-notch buildings provide, they are also aware that these structures' effects on the environment might lower that level. The purpose of this explanation is to define and provide context for the usage of recyclable materials in both the inside and outside of a building. The wood pallet, which is used for importing and exporting commodities, is one of the most prevalent materials in Albania, although it seems much bigger on the outside.

In this day of rapidly diminishing natural resources and mounting environmental damage, the demand for environmentally conscious interior designers is greater than ever. Because the building's outside and inside must work together as a single sustainable entity, a comprehensive approach to design is essential. Designers play a crucial role in bringing about global change because they create spaces that benefit not just the earth but also the mental and physical health of those who live in them. Depending on the natural resources used, the quality of materials, and the energy systems used, designers' activities may either impede or encourage life on Earth. Since the interiors of a building have an impact on people's emotions, thoughts, and behaviors, designers have the important task of molding the lives of those who live there. Aesthetics, functionality, and ethical considerations about human habitation of the earth and its effects on the environment are all part of interior design. "Meeting the needs of the present without compromising the ability of future generations to meet their own needs" is what the World Commission on Environment and Development means when they say that designers must be sustainable. Humans pose a threat to Earth's ecosystems since humans are a major contributor to climate change and the unsustainable use of natural resources.

LITERATURE REVIEW

Mohammed Thabit Al-Baldawi (2015) Economically speaking, using the correct material in the right location may have a significant impact on lowering material consumption. To maximize its utilization, one must also be familiar with the physical and chemical characteristics. Gaining insight into this phase may improve subsequent interior design work. The positive impact on the environment and the reduction of agricultural original material use may be seen when interior design makes use of recyclable and manufacturable materials. As an example of an agricultural material that has found its way into

interior design, we highlighted bamboo and the potential for its further development into bio composite and hybrid bamboo-glassfiber composites. After defining the different kinds of materials, we moved on to discussing smart materials and how they are used in smart homes. We also touched on the relevance of smart materials from an environmental perspective in interior design. One advantage of smart materials that we took into account is the reduction in the size of air conditioners. Another advantage is that most smart materials used in interior design are both practical and unobtrusive, making them ideal for smart home designs. What follows is a definition of the "smart home," an inventory of its primary components, and an explanation of its relationship to computerized engineering. economics and interior design using mechatronic reflection.

WAEL RASHDAN et.al (2017) As the need for eco-friendly interior design has grown, so too has the awareness of eco-friendly tactics among interior designers worldwide. The extensive use of natural resources in conventional interior design building procedures makes them harmful to the environment. Here is a chance for interior designers to improve the air quality inside a building while also doing their part for the environment. During the design realization phase, they have the power to adhere to sustainable solutions by making choices about materials, building processes, furnishings, and lighting. Research on sustainable design is plentiful, but the criteria for sustainable interior design have received less attention. To better aid ethical interior designers, it is necessary to establish selection criteria for environmentally friendly design solutions. Therefore, after reviewing the relevant literature, this study aims to provide criteria for choosing environmentally friendly interior design solutions. Having a practical and effective set of standards to guarantee consistent sustainable interior design solutions is emphasized in the paper's conclusion.

Leah Sherwood (2018) This paper seeks to answer the following question: to what extent do Canadian interior design degree programs include sustainability ideas in their curriculum? Faculty training, definitions of sustainable design methods, and the rising employment of environmental assessment technologies for buildings are some of the relevant aspects highlighted by key trends in literature discussing sustainability in higher education. Key course materials were reviewed and semi-structured interviews with instructors from six recognized interior design degree programs were carried out as part of this case study. Teaching sustainable design in a classroom setting requires a combination of strategies, according to the research. These strategies include faculty training in sustainable design, classroom collaboration with industry experts, and stricter standards for sustainable practices set by the Council for Interior Design Accreditation. In order for degree programs in design to meet the needs of lowering the construction sector's environmental consequences, sustainability must be a shared and ubiquitous concern across all design professors and program development.

Anna Beznogova (2016) A holistic definition of sustainability and the material form that architecture might take to promote holistic sustainability were the foci of this thesis. In my search for a comprehensive definition of sustainable development that tackles the prevalent underlying attitudes that prevent its implementation, I combed through the existing literature on the topic. Researching sustainability using a systems science lens that considers environmental, social, and psychological sustainability as interrelated factors proved to be a fruitful approach. In light of this, I set out to develop a system-based knowledge of material sustainability by researching various methods for achieving it in architecture, the lifespans of various commonly used construction materials, and the connections between various material businesses. In the last section of my thesis, I investigate the pros and cons of material re-use as a form of material sustainability, with an emphasis on Southern Ontario, because it is an understudied strategy. I suggest that a monitoring tool that uses public data sources might make it simpler to locate accessible sources, which would remove one obstacle to employing recovered materials. In my opinion, material re-use offers many benefits, including a means for architects to promote sustainability, a means of bringing attention to the issues surrounding materialism in our society, and the opportunity to engage in demanding but rewarding craft-based employment.

Khaled Al-Saud et.al (2024) The purpose of this research was to examine, via student-created interior design projects, the environmentally friendly aesthetic and practical aspects of garbage. Art education students used descriptive and applied approaches to create a body of work that included recycled materials, namely wood and metal, from the environment. Chemical treatment was a component of the approach for these eleven creative models in interior design. The artworks were evaluated using an assessment card that the arbitrators used to determine the level of aesthetic and functional sustainability. In order to determine whether the works' aesthetic and functional aspects satisfied sustainability requirements, technical data was gathered and analyzed using SPSS software. This program allowed for the computation of arithmetic averages, standard deviations, and t-tests. According to the results, participants' average responses were very high on the practical and aesthetic aspects of wood and metal waste sustainability. The possibility for creating artistic works that are appropriate for interior design applications inside the College of Education's venues is highlighted by this. A high level of positive involvement with the aesthetic and practical components of their creative works was shown by students, who achieved an average score of 3.984, highlighting their significant ethical value. All signs point to the possibility of achieving sustainability by

recycling metal and wood scraps. In order to achieve sustainable aesthetic and functional environmental values in the interior design curriculum, it is necessary to integrate social, environmental, and aesthetic values, according to this study. Understanding user expectations, technology improvements, and society's and users' cultural background, habits, and traditions is crucial for this integration.

SUSTAINABILITY AND THE ROLE OF THE DESIGNER

Resolving the issues of environmental degradation and global warming requires a commitment to sustainability. It was included into building practices via eco-friendly layout. While there are many ways to look at sustainability—from a social, economic, and environmental perspective—this article will only cover the latter. Design professionals have a unique opportunity to shape a more sustainable future by reducing the negative effects of the built environment and the construction sector on Mother Earth.

Reducing carbon dioxide emissions may be achieved via renovation of existing structures and interior upgrades. While up to 79% of CO_2 emissions come from structures in New York, the figure in Canada is closer to 40%. It is preferable to restore existing structures rather than tear them down and construct new ones, according to an Athens Institute. Designers and interior decorators are crucial players here. Prior to making any decisions, they need to have a firm grasp on what sustainable design is, how it works, what materials are needed, and what options are available in their local market. The designer is in charge of choosing all the interior features, as well as the finishes, lighting, woodwork, equipment, and plumbing.

The interior designer has to follow several rules and answer some important questions to get a good, eco-friendly design (Figure 1). A focus on sustainability and eco-friendliness should be used at every step of the project to address the seven identified challenges that follow a space's life cycle. Not only does this provide the most crucial stages in environmentally friendly interior design, but it is also a universal strategy for problem-solving. Always considering the repercussions of his actions and being willing to compromise are essential throughout the design process. As said before, designers have the power to have a big impact via their work, paving the way for sustainability and environmental conservation to become a reality.

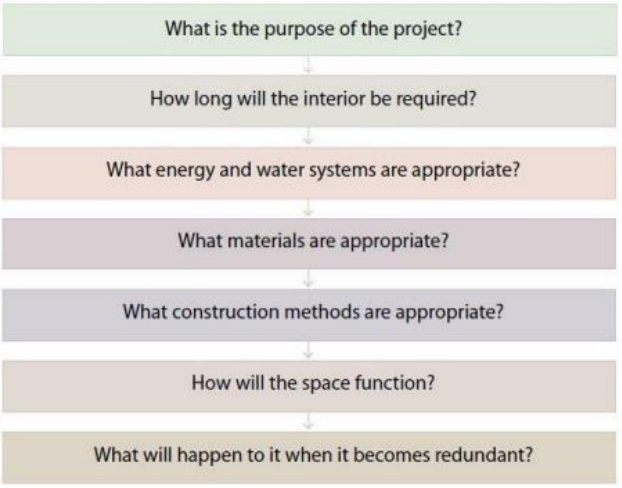

Figure 1: A diagram of questions to be answered by a designer

PRINCIPLES OF SUSTAINABLE INTERIOR DESIGN

The goal of sustainable interior design is to lessen or eliminate the environmental impact of a building's interiors. In simpler terms, it is a method that takes into account the effects on the environment at every stage of an interior's cycle. A sustainable interior, according to Pilatovicz, is one that takes into account the environmental effect of all its components and uses in a reasonable manner. A professional practice that aims to produce an interior space that is both ecologically sustainable and healthy for its users is eco-friendly interior design, according to this view.

When thinking about sustainability in the context of interior design, the most crucial factors are those that have to do with reducing the use of toxic construction materials, recycling, and pollution avoidance. A whopping 40% of all energy consumption, 30% of all carbon dioxide emissions, and 40% of all synthetic waste is produced by the building sector in EU nations. There are established standards for assessment since human-made structures contribute significantly to environmental degradation. Both the evaluation criteria and the assessment systems work towards the same goal of encouraging more sustainable practices among engineering and design professionals.

MATERIAL AS ONE OF KEY FACTORS OF SUSTAINABILITY

Instead of being a question of personal preference or luxury, the hunt for environmentally friendly materials and goods becomes an absolute need. The building industry must change to using more eco-friendly and recycled materials since it is one of the most environmentally demanding industries. Sustainable design allows for a great deal of creative control over a variety of construction materials, each of which has its own unique effect on the natural world. One of the primary factors of many sustainability evaluation

methodologies is the selection of materials, as stated in the preceding Paper. Other considerations should be considered with savings and balanced spending. What follows is a discussion on the life cycle of various materials, their significance and influence on interior design, and how to choose the right materials for certain tasks.

Material impact

We put ourselves and future generations at risk when we construct and furnish our homes with materials that contribute to resource depletion, climate change, water scarcity, biodiversity loss, trash buildup, manufacturing pollution, and health problems. Using certain materials has the most noticeable impact on resource depletion.

Many naturally occurring materials have poor availability, short recovery times, and other drawbacks. Fossil fuels are one example. There will come a day when the many plastics made from them are no longer accessible. Additionally, metal deposits are finite; projections indicate that the world's lead, zinc, and copper reserves will be exhausted within the next half-century. Over the course of millions of years, the rock is created as part of the natural geological cycle. But the stone gets eaten up before it can be salvaged due to the quarry's continual activity. Despite the abundance of stone and rock, some quarries may eventually run out of reserves, causing harm to natural landscapes.

Despite the fact that wood may be recycled, the maturation process for a tree takes a very long time. Tropical hardwoods are no exception to this rule. Ten percent of the world's tree species are in risk of extinction. Particularly threatened are mahogany and several varieties of walnuts. Despite its widespread usage, this material is often handled in an insufficient manner, which may lead to the extinction of several species of plants and animals. In addition to having a negative impact on maritime habitats and leaving behind bare soil, cutting down trees removes topsoil. The last factor contributing to climate change is extensive logging, which decreases the ability of the earth to absorb carbon dioxide from the air. Because of this, we need to have an ecological perspective when considering the materials used in interior design and aim to recycle as much as possible.

Because of the energy required to produce and maintain materials, their usage contributes to climate change in a roundabout way. The amount of energy required to acquire, process, manufacture, transport, install, maintain, destroy, and dispose of a material is known as its embodied energy. To illustrate the process, let's say we're designing an interior space with stone. Before we can even think of mounting the stone, it must undergo processing at a quarry, transfer to a factory, cutting and shaping into slabs, transportation to the building site, and last, mounting. Nevertheless, stone slab upkeep becomes necessary once the area begins to be used. In addition, when the material's usefulness has been exhausted, it has to be disassembled and sent to a facility for recycling, landfill disposal, or reuse. This lengthy process relies on fuel at every step, which adds to emissions of carbon dioxide and global warming. Processing natural materials less intensively may overcome this issue. Similarly, water consumption throughout a material's life cycle is affected by its selection and treatment.

Materials' lifetime From its inception as a raw material all the way through to its eventual disposal, building goods undergo what is known as a "cradle-to-grave" investigation. It allows one to calculate the materials' long-term costs. An important part of solving sustainability problems is looking at the whole material life cycle, as stated before. Some concepts are implied by the life cycle design. From the procurement of raw materials to their final disposal, the effects of each stage of manufacturing are considered. According to Figure 2, there are three distinct stages in a material's life cycle:

- Pre-Building
- Building
- Post-Building

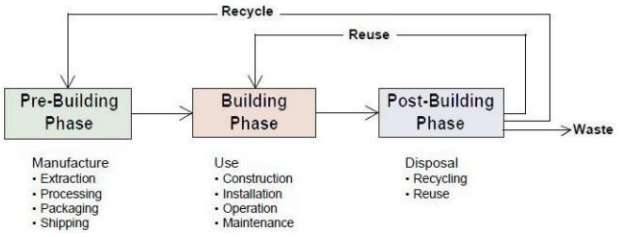

Figure 2: Scheme of a life cycle of a material

Material choice – eco-friendly and recycled materials

When planning the interior architecture of a room, one of the most crucial aspects in considering sustainability is selecting the appropriate materials. We have picked several eco-friendly and recycled materials based on the environmental implications of the materials indicated above, as well as the norms and principles of sustainable design. In addition to the material's inherent properties, we also considered its environmental effect across its whole life cycle, including its toxicity, reusability, and recycling potential, as well as the reproducibility of its sources. Wood panels, glass, metals, and gypsum board are the most popular base materials used in environmentally conscious interior design. You may use them to create a completed surface or use them as a base for finishing. Various types of particle board, plywood, cement board, and fiberboard are all considered wood panels. Be cautious when selecting this material; look for boards that have resin residues but do not contain formaldehyde, and verify whether the wood is recovered or sourced from certified sources. Such panels are an example of the limited and effective use of wood in the manufacturing of high-quality furniture and panels of varying sizes. Because it is non-toxic, recyclable, and made from plentiful natural resources, glass has a medium energy consumption rate throughout its life cycle.

Incorporating recycled glass into an existing material or making it into tiles and countertops are two examples of its many potential applications. Metals have a reputation for using a lot of energy; to cut down on losses and help save raw resources, it's best to utilize recycled metals. Because of its high insulating properties and low energy usage, plasterboard has a low embodied energy. The use of recycled-content plasterboard helps to redirect waste gypsum from landfills, which is a major concern due to the amount of waste created during installation and deconstruction.

CIRCUS CANTEEN, INDIA / MULTITUDE OF SINS, BANGLORE:

Showing the possibilities of reused materials in design, Smitha Thomas of Bangalore's Multitude of Sins firm created the Circus Canteen. The restaurant contains a collage of undesirable artifacts found locally. 'Prioritizing nature, nutrition and livelihoods,' this farm-to-table cafe claims. The canteen has an eco-friendly design and adorns itself with salvaged materials. Each table is adorned with an odd assortment of items sourced from citywide donation drives, salvage markets, trash yards, and dumpsters, including cassette cassettes, DVD players, paintbrushes, funnels, wheel rims, and a whole van. Inspiring free expression, the Circus Canteen takes you on a journey down memory lane.

APPLICATION OF GREEN ENVIRONMENTAL PROTECTION AND ENERGY-SAVING MATERIALS

By being mindful of what we buy, we may lessen our impact on the environment and preserve scarce materials. So, to minimize resource waste, it is important to prioritize the use of decomposable and environmentally friendly materials in the design process and to avoid using non-renewable materials whenever possible. Clean up the environment and make better use of the resources you have. Furthermore, it is important to incorporate realistic planning and material selection during the design process, taking into account factors like the space's layout and area. Avoid using non-renewable materials excessively in the pursuit of ostentatious luxury; instead, make extensive use of renewable materials, including recyclable ones that can be reused without breaking. On top of that, throwing away some building debris during interior decorating is a given. Reusing and recycling these products usually helps keep costs down and resource use down.

Design of Indoor Lighting

The inhabitants' physical and emotional well-being may be enhanced with appropriately lit interior spaces. There are three types of lighting: natural, artificial, and mixed. Full sun exposure is ideal.

Figure 3: Design display diagram of energy-saving materials (self-drawn)

used to illuminate the space. Figure 3 shows that the total illumination of the interior space has been substantially enhanced thanks to the floor-to-ceiling windows that let in more natural light. You may also see the outdoors via the glass. The inhabitants' living mood is also improved by the judicious utilization of natural light. Factors such as building distance, room orientation, inside sunlight area, and sunshine timing should all be considered when designing artificial lighting for indoor use. When planning a room's artificial lighting, interior designers should think about how to minimize energy consumption while maximizing natural light and other environmental aspects. They should also take the space's layout and layout in relation to the artificial lighting's placement within the room into account.

Arrangement of Indoor Green Plants

A few verdant plants, like dill, may refresh the air and establish the mood after the interior design is complete. As shown in Figure 4, it may enhance the room's color scheme while also making it more lively and bringing a sense of physical and mental joy to those who live there.

Figure 4: Indoor green plant layout (self-drawn)

CONCLUSION

Sustainable materials, promotion of reuse and recycling, and efficient design are a few ways in which interior designers may help the environment. The goal of interior design should be to make people's lives easier by making their homes and workplaces as pleasant as possible. Every part of our life, including interior design, is affected by the issue of global pollution. For interior architectural projects to have a minimal impact on the environment, sustainability must be a top priority. Achieving sustainability is mostly the responsibility of the architect or designer. In addition, choosing the right materials is a crucial part. A life cycle evaluation makes it possible to track the particular steps that materials take. The whole procedure is intricate and addresses only one facet of the sustainability problem, but it does much to pave the way for a more sustainable future. In addition to being a style of design, "green ecological design" is a way of thinking about life that promotes sustainable development. Unfortunately, the real demands of social progress have been largely ignored in favor of an obsession with style, wealth, and energy-intensive architecture.

REFERENCE

1. Mohammed Thabit Al-Baldawi et.al "Application of Smart Materials in the Interior Design of Smart Houses" Civil and Environmental Research www.iiste.org ISSN 2224-5790 (Paper) ISSN 2225-0514 (Online) Vol.7, No.2, 2015

2. Wael Rashdan et.al "Criteria for Sustainable Interior Design Solutions" WIT Transactions on Ecology and The Environment, Vol 223, © 2017

3. Leah Sherwood "Sustainability in the Higher Education of Interior Designers"2018

4. Anna Beznogova "Navigating the Complexity of Material Sustainability for Architectural Practice"2016

5. Al-Saud, K.; AlAli, R.; Al saud, A.M.; Abouelela, A.S.; Shehab, R.T.; Moneim, D.A.A.; Hamid, A.E.M. Exploring the Aesthetic and Functional Aspects of Recycled Furniture in Promoting Sustainable Development: An Applied Approach for Interior Design Students. *Sustainability* **2024**, *16*, 4003. https://doi.org/10.3390/su16104003

6. Stegall, N. (2006). Designing for sustainability: a philosophy for ecologically intentional design. Design Issues, 22(2), 56-63.

7. Materials Library (2011). Material ConneXion, Retrieved February 12, 2013, from http://www.materialconnexion.com/Home/Services/MaterialsLibrary/tabid/89/Default.as px.

8. Jones, L. (2008). Environmentally responsible design. Hoboken, New Jersey: John Wiley & Sons, Inc.

9. Kang, M., & Guerin, D. (2009). The state of environmentally sustainable interior design practice. American Journal of Environmental Science, 9(2), 179-186.

10. Foster, K., Stelmack, A., & Hindman, D. (2007). Sustainable residential interiors. New Jersey: John Wiley and Sons.

Corresponding Author

Prof. Ar. Amol Madhav Bapat*

Professor, Aditya College of Architecture, Mumbai, Maharashtra

Email: bapatamol06@gmail.com