



CORRUGATED FURNITURE: A SUSTAINABLE APPROACH TOWARDS INTERIOR DESIGN

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ABSTRACT

In recent times, Interior design practices have seen a dramatic shift with design strategies, which is focusing on providing healthy and sustainable indoor environments for the occupants. Interior designers feel compelled and can easily make a positive difference to the environmental problems extenuating it through their design choices to pursue sustainable design solutions for the given space. To achieve the same it's apparent that Interior designers need to reduce the consumption of materials which creates negative impacts on environment, and choose them wisely to mitigate the same. Furthermore, to inculcate sustainability in interiors the designers should always put their practice in accordance to the 4R's that is by giving first priority to Reduce, second Re-use, third Recycle and ensure that any new materials used are Renewable. Sustainable interiors is all about creating the indoor spaces more eco-friendly, along with acquaintance of positive cliental approach through practicing and implementing innovation in design. Amidst the array of sustainable base materials like wood, bamboo, particle boards, straw boards, and other customary materials like metal and plastic which are commonly used in making furniture units of either commercial or residential establishments; have now begun to be replaced by the furnitures made by corrugated sheets so as to cater the need of sustainability in interiors along with innovation in the furniture design. Corrugated sheet being a packaging material also proves to be a versatile material for making the furniture units. It is durable, light in weight, recyclable and eco-friendly base material offering a good alternative solution to wooden, metal and plastic furniture. It basically works on the joinery details which evades the use of screwing and nailing process for the furnitures to be made. In view of the above an experimental study focusing on assessing the knowledge regarding the corrugated furniture was undertaken. The sample of the study comprised of fifty selected Interior design students from The Maharaja Sayajirao University of Baroda, Vadodara. The purposive sampling technique was used for the study. Additionally, the study also aimed to create awareness regarding the corrugated furniture through conducting the training programme for the respondents and to accustom them for designing the corrugated furniture through learning various joineries deployed by making the prototyped furniture itself in actual scale. The findings revealed that the majority of the respondents possessed poor knowledge with regards to the information, making and usability of corrugated furniture. The training programme conducted played a vital role in increasing their understanding about the corrugated furniture and its curation process which also helped in inculcating the practice of using the sustainable material in furniture design. This in the long run would surely be beneficial to design fraternity as well as the society to become more environmentally sensitive and sparkle the context and need for sustainable Interior design, leading towards better health and well-being of the global ecosystem.

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INTRODUCTION

The story of man's interaction with natural environment dates back to the dawn of man's emergence as the dominant species on our planet, Earth. This environment is being irreversibly degraded day by day due to prevalence of human activities aimed towards economic development, industrialization, growth of human population and improving man's standard of living by satisfying their wants and desires. The inevitable outcome of this development is becoming the major reason for environmental deterioration. The present scenario of environmental degradation, which in line depreciates the human health calls for development of positive environmental practices, ecofriendly approach and need for sustainability which has to be enhanced (Lokhandwala, 2017). According to Hyllegard, Ogle, and Dunbar, (2006); "Sustainable development has been defined as the development that addresses current needs while remaining adaptable enough to ensure that the needs of the future can be met". The terms sustainable and sustainability have both grown increasingly popular nowadays, and are often used in reference to the natural environment which focuses on responsible management of natural resources (McLean, 2009). The concept of sustainability has become very thoughtful and profound topic within the residential and commercial Interior designing from the past few decades. This is primarily due to accelerated pace in which consumer needs and expectations which are changing the perspective of awareness of environmental protection is spreading. The concept of Sustainable Interior Design is closely linked to environment construction and building design efficiency.

Sustainability is becoming a major concern within the Interior design field due to extensive resources needed for interior use (Ruff and Olson, 2009). The interiors of residential and commercial areas use some elements which harm the environment in direct or indirect manner. There are paints which contain volatile components (VOC's) and their emissions are harmful, use of non-biodegradable products for furnishings, use of light fixtures which consumes more electric energy, use of materials which are made from nonrenewable resources and many more elements which degrades the environment and also effects the health of the residents with reduction in the life-cycle of the building (Lokhandwala, 2017). In present scenario, as one sees the paradigm shift from traditional design to Sustainable Interior Design, wherein practices of the Interior designer plays a very important role. Material and finish selection is an important area in which an Interior designer can achieve easy sustainable solutions. One viable solution available to Interior design professionals for the conservation of natural resources is the specification of long-lasting sustainable materials.

Moreover, amongst the array of sustainable base materials like wood, bamboo, particle boards, straw boards, and other customary materials like metal and plastic which are commonly used in making furniture units of either commercial or residential establishments; Interior designers have now begun to practice the design with inclusion of furnitures made by corrugated sheets so as to cater the need of sustainability in interiors along with innovation in the furniture design. The terms paper and paper-based products (including corrugated sheets) are quite often used interchangeably. Paper based products such as corrugated cardboard, paper tubes, honeycomb panels and strong papers like Kraft and Washi can

be successfully used for the production of interior design products for everyday use namely furniture units, indoor partitions and many other related products. Paper and its derivatives are often even used for other purposes such as educational (origami) or at social and artistic events. (Latka, 2017). Moreover, Latka (2017) also stated that paper and its related products which has an organic origin are relatively economical and eco-friendly materials; so are fit to be used in spatial structures. They can also be well used in events such as fairs and exhibitions where the main focus is easy mobility of furniture units, which all in all would also evade the ecological burden in the form of construction waste. Corrugated sheet, also known as corrugated board or corrugated fibreboard, is the most popular material used in the packaging industry (Wlodzimierz, 2011). Corrugated sheet is a sandwich composition of two flat layers of paper with a layer of corrugated medium (also known as fluting) in between. The layers are then laminated together to form a corrugated sheet. The thickness of the fluting can range from 0.8mm to 4.8mm. The corrugated medium is made of recycled paper, which is also known as Wellenstoff paper, or virgin paper (Minke, 1980).

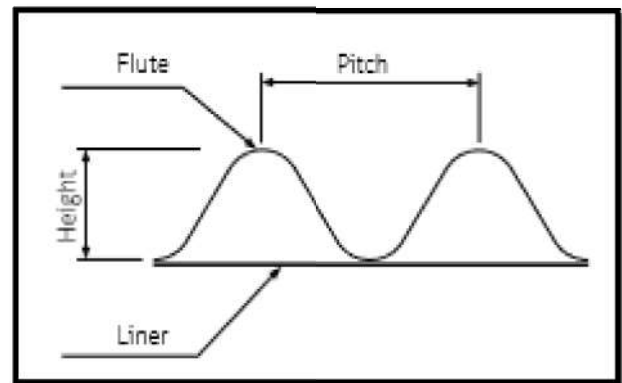


Fig. 1. Structure of Corrugated sheet (Source: Latke, 2017)

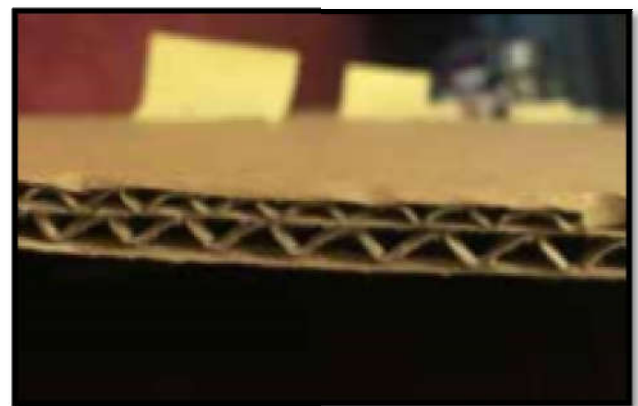


Fig. 2. Corrugated sheet (Source: Latke, 2017)

To address the sustainable approach in the design field, interior designers play an important piece in the sustainability puzzle and aid in protecting the environment in every manner which they can through practicing sustainability. These professionals stand distinctive among other related professionals as they have both the expertise and the platform to promote sustainability. In context to propagate the agenda, in late 90's furnitures out of the corrugated sheets were curated. The most popular piece of furniture made out of corrugated sheets was the chair from the Easy Edges series, 'Wiggle side chair', designed by American Architect Frank O. Gehry in 1970.

The series of chairs was made out of corrugated sheet profile, laminated to each other in order to make the composition more stable (Fig.: 03). In 1994, another exemplary corrugated furniture design was given by well-known Architect Shigeru Ban from Japan labelling the collection of furniture units as 'Carta Collection'. The collection was later expanded to designs showcasing chair, lounge, screen and table and many more furniture elements made up from corrugated sheets (Fig.: 04) (Latke, 2017).



Fig. 03 Wiggle side chair, Frank Gehry, 1970
(Source: Latke, 2017)



Fig. 04. Chair, Shigeru Ban, 1994 (Source: Latke, 2017)



Fig.: 05. Lounge chair, Zach Rotholz, 2011 (Source: Latke, 2017)

Since then corrugated sheets has been taken up as the contemporary building material round the globe to create different interior elements which leads a step forward towards establishing sustainable interiors. Through deployment of basic joinery details like cut and fold method, slit joinery, and layering method the curation process is easier as it evades use of screwing and nailing. Consequently, the objective of the present study was to assess the knowledge regarding the corrugated furniture among the selected Interior design students and to impart the necessary information regarding the same through a practical approach, which in all helped the designing students to have a deep insight in making furnitures out of corrugated sheet.

Objectives of the study

- To assess the knowledge regarding the corrugated furniture and its usability.
- To orient and introduce students regarding the basic characteristics and usability of the corrugated sheets as a core material to be used for making furniture.
- To acquaint the students with the basic joinery details namely; cut and fold method, layering and stacking and slit joinery.
- To accomplish the task of making the selected prototyped furnitures.

MATERIALS AND METHODS

The research design for the present study was experimental in nature. Fifty interior design students were selected purposively from The Maharaja Sayajirao University of Baroda, Vadodara. A structured questionnaire was employed to collect the data at the initial stage of the study; which was to assess the knowledge regarding the corrugated furniture and its usability. It contained a summated rating scale, along with the three point continuum for the response structure. The various items listed on the above scale were 18. The scores on the knowledge scale were interpreted as 'Good', 'Moderate' and 'Poor' regarding the knowledge regarding corrugated furniture and its usability. The scores from 3 through 1 were ascribed to the responses. The possible maximum and minimum scores was divided in three categories having equal intervals. The high scores on the scale indicated high disposition of knowledge regarding the corrugated furniture and its usability. A training programme was also planned to acquaint students regarding the corrugated furniture. Moreover, it also gave hands on experience to the students to make the selected prototyped furniture in actual scale.

Major Findings

The computed statistical data of the study, showcased the results regarding the knowledge of the corrugated furniture and its usability among the selected Interior design students from The Maharaja Sayajirao University of Baroda, Vadodara; which are depicted as under: The findings analyzed that majority (82.55%) of the selected Interior design students were having poor knowledge regarding the corrugated furniture and its usability. The lack of knowledge was found in the technical aspects as well as the basic characteristics of the corrugated sheets and the furniture made out of it. Thereafter, adhering to the results of the study an audio-visual session was conducted to bridge the gap of knowledge regarding the corrugated furniture which was carried out by an expert focusing on the

basic information related to the corrugation, and its related furniture units. It also described various furniture units made up from the corrugated sheets which helped the students to widen their design perspectives and implement innovations in the field of design. After which a two days training programme was also conducted to adhere the remaining objectives of the study and also to give the hands on experience to the students of making selected prototyped corrugated furniture namely; a side stool, a bench, a center table, a sitting stool and a book shelf in actual scale.

Knowledge regarding the corrugated furniture and its usability (n=50)

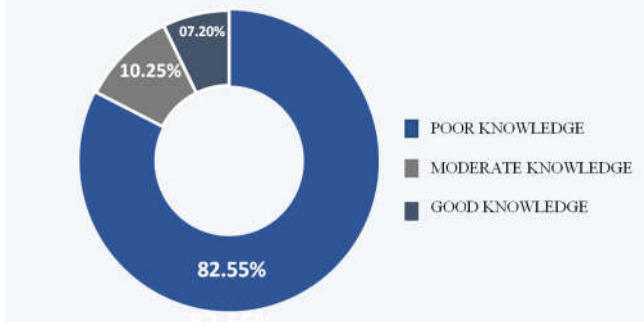


Figure 6. Distribution of the respondents according to their knowledge regarding the corrugated furniture and its usability



Plate no. 2 and 3. Experts orienting students



Plate no. 1. Expert delivering the audio-visual session

The training programme was initiated, by the two experts with the brief introduction about the characteristics of the core material i.e. corrugated sheets. The students were then directed to doodle and sketch whatever they ought to design, which initiated the process of concept development. After which the students were oriented in making the conceptual and measure drawings of the furniture to be made. The actual scale drawings were then drafted on the corrugated sheet itself and were further cut accordingly under the guidance of the experts. Then the individual segment of furniture were assembled through deploying the joinery which were cut and fold, layering/stacking and slit joinery. After which the furnitures were given the final touch by applying the adhesive wherever it was required and smoothening the edges with the help of sand paper. The training programme conducted played a vital role in increasing and bridging the knowledge gap among the Interior design students about the corrugated furniture and its curation process along with the various joinery details which would help the students in inculcating the practice of using the corrugated sheet as the core material in furniture design promoting sustainability in Interior design.

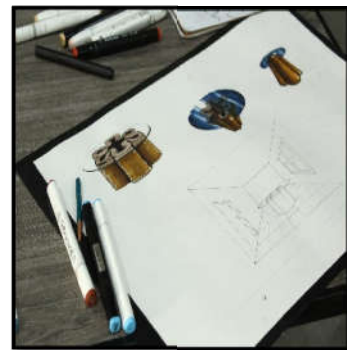


Plate no. 4, 5 and 6. Sketches, doodling and measure drawing prepared by students during training programme

Conclusion and Implications

Interior designers are professionals who are responsible for the design of residential as well commercial spaces. Interior environments are the places that meet the human needs. . Sustainable interior design has become a powerful communication tool of the corporate world, which is demonstrating a revolution in the construction industry. Through practicing an eco-friendly selection an Interior designer can greatly impact lives of the occupant; which should adhere the willingness in creating the sustainable environments indoors. As the design industry has ached, it's the time to readdress one's values of the product appearance and material culture in order to tackle the environmental degradation that can result from the very first step of design process. Designers now have a responsibility to create indoor environments that reflect environmental awareness, environmental protection and sustainability of building itself. Interior designers must now question the effects of their work not only on the natural environment, but also in view of human health; along with the considerations of the effects of their work on humanity. The final outcome of the experimental study conducted had a profound positive impact leading to enhancement of knowledge regarding the corrugated furniture and its usability, which was initially found to be very poor among the students which were taken up for the study. The hands on experience given during the training programme proved to be very beneficial to the students as it gave a deep insight of the process of making a furniture, right from the concept development to the final finished product. The findings of the study also brought out number of implications for the field of Family and community Resource Management where management of various resources in its curriculum at each level. Furniture design is part of the core curriculum of the interior design field offered at about undergraduate and post graduate level. Other courses related to Interior designing such as; Building materials and Housing, Residential and commercial space designing, Lighting in interiors and Landscaping and Gardening are among the thrust areas of the field. Hence, sustainable interiors as a topic can be incorporated in the curriculum of the courses offered by Family and Community Resource Management.

The disciplines also offers extension programmes as an integral part of the curriculum. By conducting such programs the awareness can be created among the masses as the present research undertaken reflected the need of creating awareness among the practicing Interior designers as well as clients. The various educational institutes catering to design curriculum, Government and Non-Government Organisations, LEED, SVA-GRIHA, Architects and Interior designers who are practicing Sustainable interiors as it is all about creating the eco-friendly indoor spaces, along with practicing and implementing innovation in design. Similar training programs, workshops, expert session and seminars can be conducted on practices which lead to Sustainable Interior Design and bring all the concerned professionals and the designing students on the same platform where awareness can be created and technical solutions can be brought on board.

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