



ANALYSIS AND COMPARATIVE STUDY OF USE OF CARDBOARD AS A MATERIAL FOR DESIGNING FURNITURE

Ar Gauri Kirolikar¹ | Ms Bharti Deshmukh²

¹ Professor at Shri Datta Meghe College of Architecture, Nagpur(M.S).

² Former Professor at Shri Datta Meghe College of Engineering, Airoli, Mumbai.

ABSTRACT

Cardboard is a major material in the form of paper used as a material for packaging. The whole packaging industry is dependent on the cardboard. It is available in various forms and shapes like sheets rolls and tubes. It is basically manufactured from recycled paper. In the growing need of environmental consciousness and awareness, the paper covers the alternative use of the same cardboard in the same form without changing the manufacture process as a material for making and designing furniture, with the comparative analysis of the contemporary materials that are already used for designing furniture. Also during the phase the comparative analysis of cost effectiveness would also be looked upon.

KEYWORDS: Cardboard, furniture, cost effectiveness, design.

Introduction:

The topic of study is the use of cardboard as material for designing furniture. The paper will be dealing with the existing use of cardboard, the limitations, and the drawbacks and then finally the methodology adopted to overcome the drawbacks from the material thereby using it as a material for making furniture.

During the course of study the main emphasis would be given to the different known techniques of use of cardboard for making furniture and the innovations carried out and above all the testing of strength of the material and then finding out the optimum solutions for rectifying the loop holes.

“Cardboard chairs and tables may be the answer for people who do not want to spend a lot of money on traditional furniture, whether because they move a lot or because they will outgrow it in a few years. Though it may be gaining popularity with the recent push for more environmentally-friendly living, the idea of cardboard furniture has been around for several decades. Designers are now using it to stylistically accentuate homes and more people are learning about its many uses.”

As an Architect and a designer, to analyze and find out different options and solutions is a part of the task because of growing trends, population and change in the thought process of users, so cardboard is thought of an option to be used as a material for making and designing furniture.

Various research works and design options and alterations in the process have been made by many designers, so to continue with the same this topic for study is being adopted. There is a great future of cardboard furniture in the coming time with the increase in number of users.

Cardboard has been used as a material for making furniture by Ar. Frank O Gehry in 1972, so there are many researches done for the use of cardboard as a material for making furniture, the thesis will be dealing with a type of extension and some innovations that can be made in the techniques so as to achieve more strength and durability.

Advantages of cardboard as a material to be used for designing furniture:

1. As per the topic taken for study that is use of cardboard for making furniture, the major advantage is easy to use and portable, so the interiors can be changed frequently
2. Secondly the material is light weight and cost effective also, so after a span of time replacements and changes in design can be easily made.
3. Flexibility in designing can be achieved as there is no specific joinery or nailing or screwing required as in timber or metal furniture
4. The total assembly can be erected without any help of large machinery and factory.
5. The overall cost of the final product is comparatively very less as compared to the contemporary materials used for making furniture as the raw material itself is a recycled one, and can be taken directly from the used boxes or packaging material

6. There is no need for trained laborers to assemble the whole furniture it can be a do it yourself exercise also.
7. Last but not the least cardboard is a material made from recycled paper so the aspect of environment and environment friendly design is also considered, which is a major issue of concern all over the world

Comparative study of various contemporary materials used for making furniture in the form of SWOT analysis.

Materials	Strength	Weakness	Opportunities	Threats
Timber/wood	Can be finished Durable Aesthetically pleasing	Susceptible to termite attack Not resistant to moisture	If the wood is seasoned properly these weaknesses can be avoided	Many new materials and low cost also are available such as plastic and cane
Metal	Durable Aesthetically pleasing Can be molded in desired forms	Not 100% moisture resistant At times the welding joints don't look pleasing	Since the metal furniture is lower in cost than wood, minor changes can make it more usable	Many new materials and low cost also are available such as plastic and cane
Plastic	Durable Aesthetically pleasing Can be molded in desired forms	Not resistant to heat	Since the furniture is light weight so there is always an opportunity	Not at all environmental friendly can cause great harm to nature. cannot be disposed
Cane	Vernacular and aesthetically pleasing	Not resistant to fire and moisture	Since the furniture is light weight so there is always an opportunity	Doesn't come under the category of luxurious furniture. mostly used outdoors
Bamboo	Vernacular and aesthetically pleasing	Doesn't catch fire easily if treated with chemicals .and same goes with moisture	As compared to cane it is more stable and workable	Bamboo cutting is not allowed in large number so there is a threat.
Cardboard	Environment friendly and is light weight, also trendy furniture can be made using this material	Not resistant to moisture and fire	Cardboard is nowadays being used as an alternative material, and many firms and designers are into making such furniture	Since the mentality and thinking of users is biased and also other materials are there so it can be a threat

Material and Methods:

Now that the paper is emphasizing mainly on cardboard so the material is cardboard and the methods that are listed down are based on the case studies and literature studies done through various medium. Here the manufacturing process is not taken into consideration as the furniture assembly is not dependent on the process of manufacture. The sheets that are used for packaging are directly used as a material for making the furniture

1. Folding sheets
2. Fixing/interlocking sheets
3. Gluing sheets
4. Use of cardboard tubes

On the basis of the above mentioned division the type of furniture and the comparative analysis along with the fixing details are listed one by one. During the comparative study the parameters that are studied are the appearance fixing and basic method of assembling the whole system and the observations done and at last a table explaining the analysis of the various types of assembly and the various parameters that a designer consider while designing are covered, like aesthetics, maintenance workability durability etc.

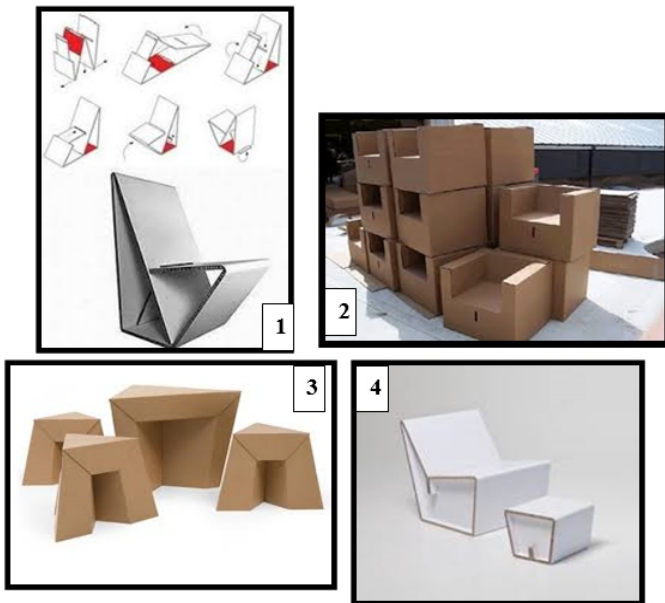
1. Folding sheets

Image 1 is showing a chair made from folding technique where a single piece is being used to form a chair with the help of folds.

Image 2 is again showing a simple folding technique used in making of cardboard boxes again with a single piece.

Image 3 is again showing folding and fixing technique where the whole assembly comprises of two or three pieces.

Image 4 is showing another example of folding technique

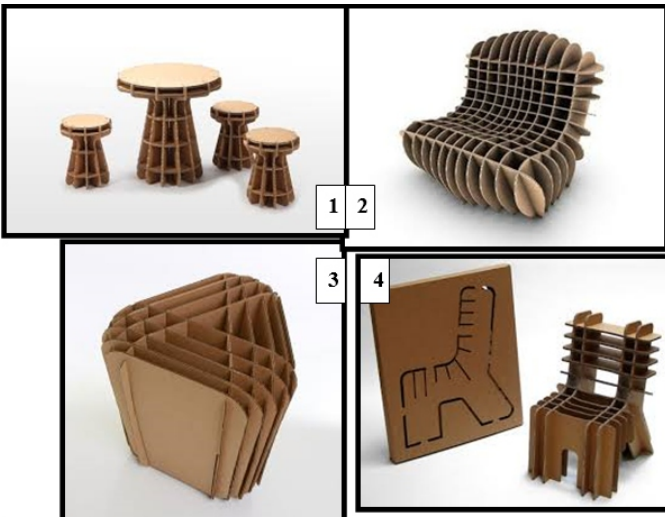
2. Fixing/Interlocking sheets:

Image 1 is showing the arrangement and fixing of sheets to form a small table. Since the fixing itself looks so nice that there is no need of any surface treatment.

Image 2 is again showing the same arrangement to form a chair.

Image 3 is having some curvilinear shapes

Image 4 is showing small circular shapes thereby forming tables

3. Gluing sheets:

Image 1 is showing the arrangement of sheets of cardboard by gluing them together and then cutting in desired shape.

Image 2 is showing similar arrangement and then gluing them together in the required manner

Image 3 is showing a chair or seating

Image 4 is again showing a very aesthetically arranged to have a seating.

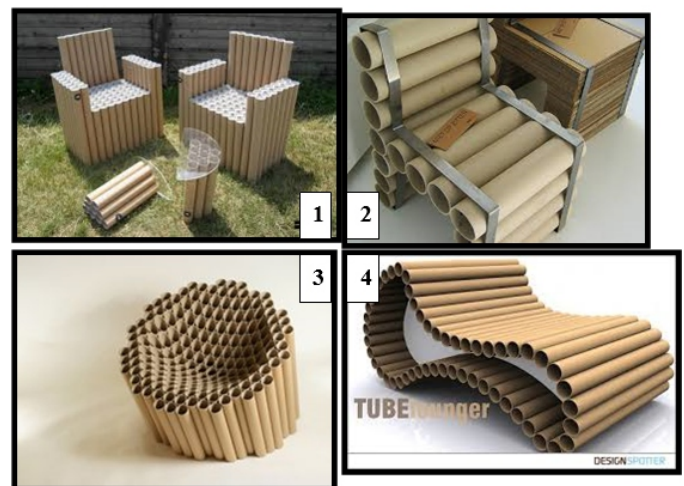
4. Cardboard tubes

Image 1 is showing a simple vertical assembly of rolls of different sizes to form a chair and in the similar way a table with glass top.

Image 2 is showing a horizontal assembly of rolls and use of metal to give strength to the structure

Image 3 is showing again the vertical arrangement of different sizes of rolls and then forming a shape out of it

Image 4 is showing the arrangement in horizontal direction with a abstract shape.

Comparative analysis of different fixing methods and techniques studied

S No	PARAMETERS	TUBES	FIXING	GLUING	FOLDABLE
1.	AESTHETICS	Aesthetically pleasing, gives a very nice visual effect	Looks technical, as the fixing is done according to the direction of the grains	Simplest type, looks like plywood furniture	Another simple technique based on folding of boxes
2	DURABILITY	Since the rolls are factory made and hollow, so the durability is good	Durability depends on usage	Durable since very less number of joints are used	The durability depends on the efficiency of the folds done
3	STRENGTH	Strong enough to bear the load because of hollow rolls	If the fixing is done with proper parameters the strength is good	The strength entirely depends on the type of glue and the gluing process done	The strength depends on the type of cardboard and the folds made.
4.	ASSEMBLY	Simple assembly with slots to be made and rolls to be inserted.	Assembly is the major catch here, if done properly then only it is durable	Assembly is simple, more like working with plywood	Again assembly is simple and folds and slots are there.
5.	WEIGHT	The furniture would be having less weight as the rolls are hollow	Here also the weight is less since there are gaps in between	Here the weight is more since the sheets are glued one on other to get the desired base	This also has comparatively less weight since it has only folds like boxes
6.	COST	Low cost	Low cost	Can be costly depending on glue cost	Low cost
7.	EASE IN HANDLING	As a user it is easy to handle and dismantle also	Not very easy to handle as there are many small pieces which constitute the whole frame	Easy to handle	Also easy to handle
8.	VISUAL COMFORT/COMFORT	Comfortable visually and as a user also, like bamboo furniture	Since the sheets are placed vertically and horizontally gives a feel of framework	Just like wooden furniture	One might feel sitting on some box.

Conclusion:

To conclude it can be said that cardboard can pose as a very good alternative for making furniture if properly used. Also the material is a produce of recycled paper which adds to more advantage of the material. Many architects and designers are already working on the same, but it is not being done at a grass root level. In the days where the threat to environment is increasing day by day, such innovative and interesting design ideas need to be advertised and worked upon more and more. cardboard should not be just become a material for making craft assignments but it should be more and more experimented and tested to shift the excessive use of timber in furniture industry which can thereby result in less cutting of trees and can help conserve the natural resources to some extent.

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