

Acceptability of Cardboard Furniture among Students Living in Rental Spaces and Hostels

Ar. Sarang Holey¹ and Ar. Ankush Khandare²

¹Asst. Professor, P.R. Patil College of Architecture

²Asst. Professor, P.R. Patil College of Architecture

E-mail: ¹sarang.says.hi@gmail.com, ²ankushkhandare2912@gmail.com

Abstract—Cardboard is a material which has been thought as a disposable material, having short life with poor structural properties by many. But in reality it can be used for various different purposes with extended lifetime if designed properly. Also in today's world where environment and sustainability is a major concern use of waste cardboard needs to be promoted.

There are several common uses of cardboard in India as packaging material for various different goods like groceries, clothes, gift articles etc. The waste cardboard out of this could be effectively used to manufacture furniture items like chairs, tables etc., which could be made available at an economy for those who are living in rental spaces and change their working places often.

The students living in rental spaces are often not provided with basic furniture items and cannot afford wooden furniture as it is expensive. Also students frequently change their rental accommodation and faces difficulty in moving the wooden furniture items. Cardboard furniture would provide an economical and lightweight furniture option for this work group.

This research paper studies the acceptability of above said cardboard furniture on parameters like usability, structural safety, economic viability and easy transportability. The results so achieved shall formulate strategic decisions to be made by Interior furniture companies to add a cardboard furniture segments to their established product segments.

Keywords: Cardboard, Furniture, lightweight, economic.

1. INTRODUCTION

Using cardboard to make furniture is an eco-friendly idea which took shape in the designs of the famous architect **Frank O Gehri** in the late 20th Century. He firstly deigned furniture with corrugated cardboard in the late 1960s and achieved great success. Corrugated cardboard materials are biodegradable, reusable, recyclable and its resources are wide. The life products of corrugated board have excellent performance, such as environmental performance and low cost. Therefore, it is an urgent social requirement to develop inexpensive and high-quality cardboard furniture. Today, it can be seen that Japan and some Euro-American nations are designing and producing cardboard furniture. In Japan, we can see series of

cardboard furniture including cardboard beds, cardboard tables, cardboard chairs, cardboard stools and cardboard bookcase, and these furniture possesses the properties of waterproof, mildew proof, anti-moth and high strength.

This paper focuses on the use of such cardboard furniture by students living in rental spaces and hostels where basic furniture items are not available.

2. AIM

To find out feasibility of cardboard furniture to be used by students living in rental spaces by making cardboard furniture models, conducting survey and analyzing data with respect to established parameters.

3. OBJECTIVE

This study encompasses the following objectives.

1. Conduct a survey of a cardboard prototype chair and table by students of age group 18 to 22 (undergoing graduation) and understand their observations with respect to

- a. Usability
- b. Structural safety
- c. Economic viability
- d. Easy transportability

2. Create general guidelines based on the survey results for production of Cardboard furniture.

4. METHODOLOGY

Following methodology have been adopted to achieve a logical conclusion of this research paper.

1. Selection of furniture items
2. Design development
3. Prototype development
4. Survey on prototypes/User Experience

- 5. Data Analysis
- 6. Formulating Guidelines.

5. PRODUCT SELECTION

Student’s furniture requirement needs to be studied in order to establish a workable product segment which focuses on their daily routine and coherent needs. Following furniture articles were shortlisted after brainstorming.

- 1. Chair
- 2. Table
- 3. Bed
- 4. Cupboard

Out of the above list Chair and table are two distinct articles which could be listed as a must and needs to be designed. For this study work chair model has been designed and analyzed in detail.

6. DESIGN DEVELOPMENT

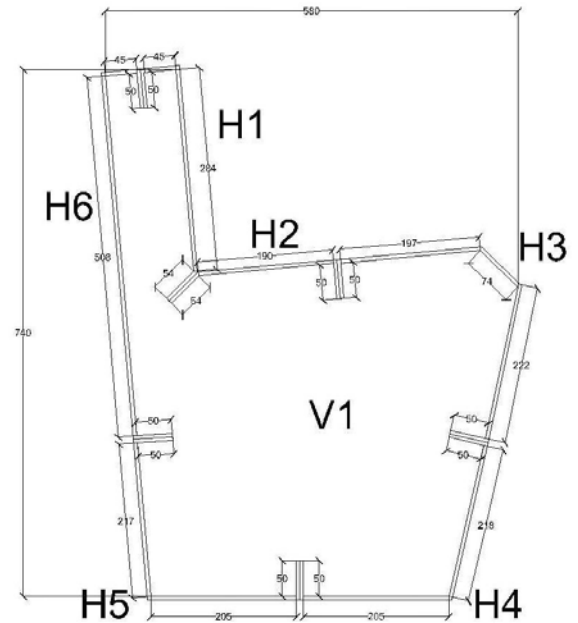
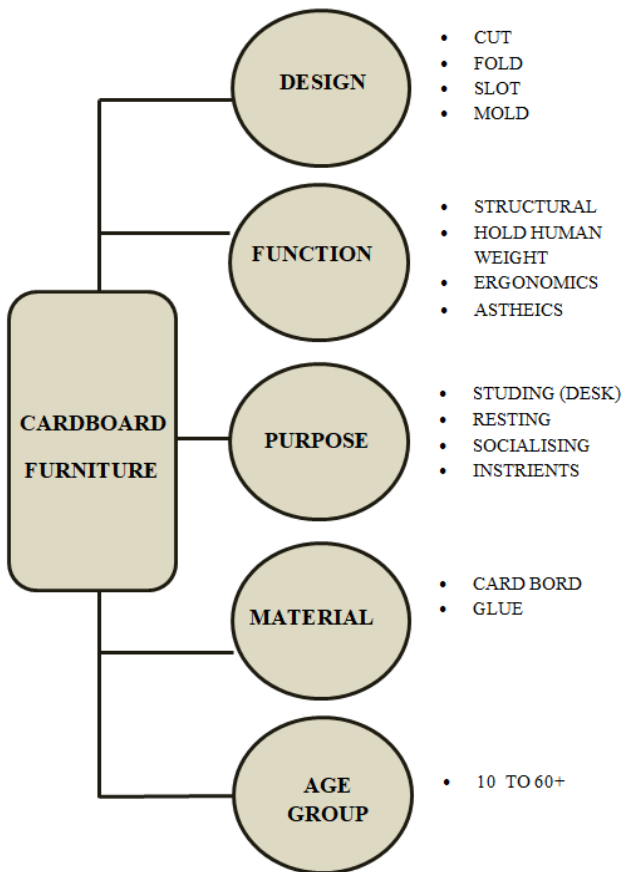


Fig. 1: Cardboard Chair Side profile

Table 1 Chair Part Schedule

S.No.	Piece No.	No.	Dimension (mm)	
1	V1	9	580	740
2	H1	1	450	434
3	H2	1	450	295
4	H3	1	450	588
5	H4	1	450	522
6	H5	1	450	521
7	H6	1	450	653

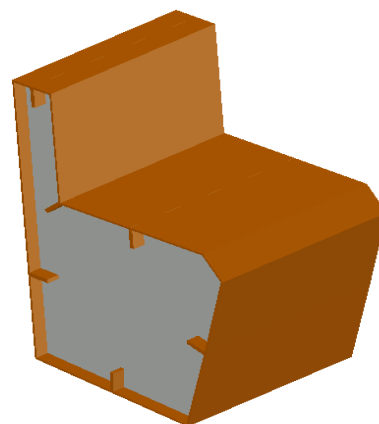


Fig. 2: View

7. PROTOTYPE DEVELOPMENT

Based on the above design rapid prototype has been developed to conduct a survey on the same. Single ply cardboard sheet from used cardboard boxes has been used in three layers to develop a structurally stable prototype.



This chair could easily carry a weight of 125kgs and weight less than 3 kg.

8. USER EXPERIENCE

A simple yet comprehensive survey questionnaire has been developed and used to rate user experience on a scale of 1 to 5 which provides valuable insight about Usability, Structural safety, Economic viability and Easy transportability of cardboard furniture.

9. RESEARCH QUESTIONNAIRE:

A. User Comfort

1. Is it comfortable to use?
Feedback Yes, Rate it in a scale of 1-5 (a to e)
Where
 - a. Very low
 - b. Low
 - c. Moderate
 - d. Good
 - e. Excellent

If No, State the issues

- a. Seat is hard and provide little cushioning.
 - b. Back Rest does not provide support
 - c. Material Quality
 - d. Others
2. Are seating angles and Height appropriate? If Yes rate it in a scale of 1-5 where
 - a. Very low
 - b. Low
 - c. Moderate
 - d. Good
 - e. Excellent

If No, State the issues

- a. Seating Height is more.
 - b. Seating Height is less.
 - c. Back Rest Angle is more.
 - d. Back Rest Angle is less.
 - e. Others
- ### B. Strength/ Durability/ Handling
3. Do you feel safe while sitting on the cardboard chair? If Yes, Rate it in a scale of 1-5 (a to e)
Where
 - a. Very low
 - b. Low
 - c. Moderate
 - d. Good
 - e. Excellent

If No, State the issues

- a. Not stable
 - b. Makes Cracking sound
 - c. The chair Wobble
 - d. Others
4. What do you feel about the weight of the cardboard chair?
 - a. Very low
 - b. Low
 - c. Moderate
 - d. Heavy
 - e. Very Heavy

C. Aesthetic Appeal

5. Do you feel the cardboard chair is aesthetically appealing? If Yes, Rate it in a scale of 1-5 (a to e)
Where

- a. Very low
- b. Low
- c. Moderate
- d. Good
- e. Excellent

D. Economics/ Cost Effective

6. Do you feel the cardboard chair is cost effective? If Yes, Rate it in a scale of 1-5 (a to e)
Where

- a. Very low
- b. Low
- c. Moderate
- d. Good
- e. Excellent

7. What should be the cost of cardboard chair?

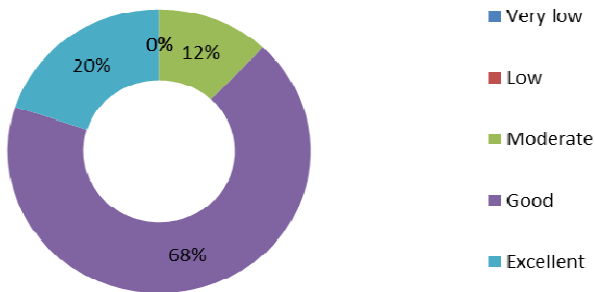
- a. Below Rs. 250/-
- b. Rs. 250/- to Rs.500/-
- c. Rs. 500/- to Rs.750/-
- d. Above Rs. 750/-

This survey is conducted on a sample size of 100 students (age group 18 to 22) selected randomly from various colleges.

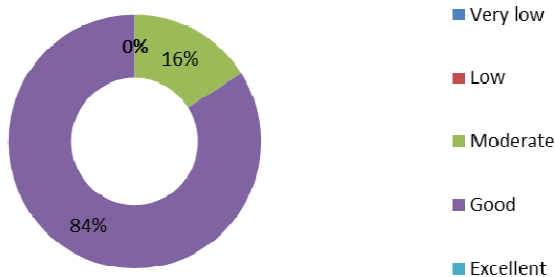
10. DATA ANALYSIS

Following Charts shows the results of the survey.

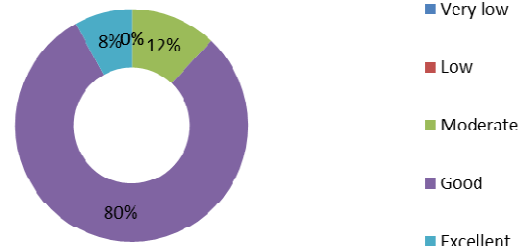
Q.1 Is it comfortable to use?



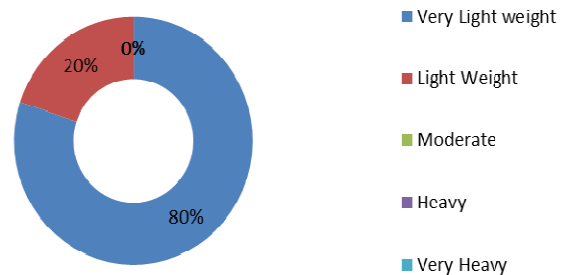
2. Are seating angles and Height appropriate?



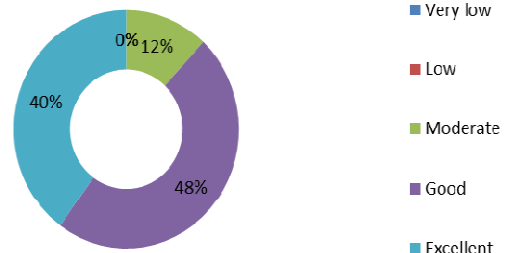
3. Do you feel safe while sitting on the cardboard chair?



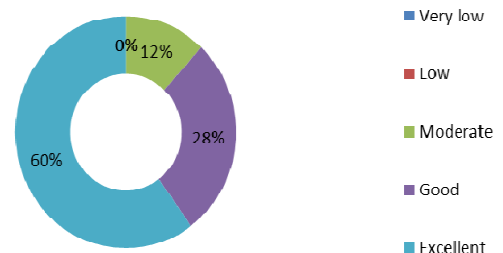
4. What do you feel about the weight of the cardboard chair?



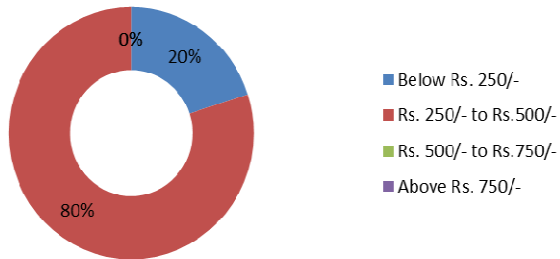
5. Do you feel the cardboard chair is aesthetically appealing?



6. Do you feel the cardboard chair is cost effective?



7. What should be the cost of cardboard chair?



REFERENCES

- [1] Bi Liuju, "Research on Corrugated Cardboard and its application", Published By: 10.4028/www.scientific.net/AMR.535-537.2171.
- [2] Yoko Taniguchi, "Collapsible furniture for the contemporary work environment", Rochester Institute of Technology, RIT Scholar Works.
- [3] Xiao Zhijian, "Research on the corrugated types of the high-strength corrugated composite cardboard based on the price-performance ratio model and its corresponding evaluation", Journal of Chemical and Pharmaceutical Research, 2014, 6(6):28822886.

11. CONCLUSION

Survey results clearly indicates that the selected survey age group is more than convince to explore the opportunity of having cardboard furniture as an economic, structurally stable and a light weight furniture alternative.

Also this piece of furniture can be easily dismantled, transported and re-assembled without any external help by students themselves.

The study also indicates that work needs to be done to increase the aesthetical appeal of such cardboard furniture. And lastly the price range of such cardboard chair shall be below Rs. 500/- as then it will be cheaper than the available PVC chairs in the market.