

Ergonomic evaluation and redesigning of Sankheda Sofa Chair

Swetabehen Mesaria and Neerja Jaiswal*

Department of Family & Community Resource Management, Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India
neerja_jaiswal@rediffmail.com

Available online at: www.isca.in, www.isca.me

Received 5th October 2016, revised 24th January 2017, accepted 27th January 2017

Abstract

Sankheda furniture is traditional furniture manufactured in small town called “Sankheda” located in Gujarat state. The distinct feature of Sankheda Furniture lies in skilled hand work and art work. Sankheda Furniture is famous for the lacquer work, colours and carvings. Sankheda furniture objects are being exported to countries like Canada, USA, Europe AND West Asia. In today’s time the population is still inclined to purchase and use the traditional “Sankheda Furniture” in the living room and other areas of home. The researcher wanted to evaluate Sankheda Sofa Chair ergonomically and redesign selected Sankheda Sofa Chair. In this study an ergonomic checklist was used for evaluation of Sankheda Sofa Chair. The dimensions of selected existing Sankheda Sofa Chair were also obtained. The researchers had suggested and redesign the Sankheda Sofa Chair with changes in dimensions to make it more comfortable and to provide leisure experience for the user. The modified functional design of Sankheda Sofa Chair was thus presented through Plan, Elevation, 3D- view.

Keywords: Ergonomic, Assessment, Sofa chair.

Introduction

Furniture has been an important part of every family. The need of furniture defers from family to family. Furniture exists not only as functional instrument that facilitate human needs but also it serves as a cultural artistic expression. The furniture’s are made of various materials like wood, metal, wrought iron and plastic. The design of furniture, material, shape, joints and carvings reflects the craftsman’s creativity. Wooden furniture was being used since centuries in every culture. Wooden furniture’s are found in maximum number varieties.

In Gujarat one can find such traditional and ornamental furniture style called “Sankheda Furniture”. The word “Sankheda” named after a small town call “Sankheda” which is geographically situated at the north-east of Gujarat. The town Sankheda is famous for its furniture and handicrafts. Sankheda Furniture is famous for the lacquer work. These are made from Teak wood¹. The craftsmen used to handcraft each piece individually in old times but now with modernization the process of furniture making has undergone numerous changes with the help of instruments and techniques. The furniture is made in unique colours of brown, orange, dark red, black and white with ornamental designs in gold and silver. The Sankheda Furniture is decorated with small wooden bells which add to its traditional and ethnic craftsmanship. Sankheda Furniture pieces are being exported to United States of America, Canada, Europe and West Asia.

At present times, varieties of modern furniture are available in Indian markets. Still Sankheda Furniture has their unique identity in them. An increasing number of populations are still

appealed to Sankheda Furniture. The modern population spends a significant amount of time sitting and relaxing in their homes. Not only comfort but also design and decorative features also play an important role in selecting living room furniture. All the furniture in living area is frequently used for relaxation.

Therefore it is not a surprising to find various researches undertaken on ergonomically designed sitting furniture design. According to Grandjean sitting down is a natural human posture which reduces the overall static muscular workload needed to look the joints of foot, knees, hip and spine to reduce energy consumption. An ergonomically proper and good sitting of an individual in seat should be able to maintain good posture while relaxing in that furniture².

A residential establishment is a place where all family members live together. It is a place where all the psychological and physiological needs of family member are accomplished. Living room is common area for all family members. It is a place where all enjoy quality of time relaxing in leisure and comfortable furniture objects.

In living room for sitting and lying down sofa and chairs are placed. In today’s time still population still inclined to purchase and use the traditional “Sankheda Furniture” in the living room of the residential establishments as sitting and beautifying purpose. Therefore, the researcher thought about studying the “Sankheda sofa chair” ergonomically.

Objective of the present study: To study the design features of Sankheda Sofa chair form Ergonomic point and to Ergonomic design Sankheda Sofa chair.

Delimitation of the present study: The study was limited to selected Sankheda Sofa chair design available in Baroda city.

Methodology

The assessment of existing furniture and redesigning of Sankheda Sofa Chair were the requirements of the present study. The electronic media was used to collect the ergonomic checklist to collect information about the existing sofa chair. For the present study the researcher had selected only one Sankheda Sofa Chair to ergonomically design checklist. The checklist had the dimensions of existed Sankheda Sofa Chair.

The data which included dimension of Sankheda Sofa Chair were collected personally by the investigator with the help of metallic measuring tape. The drawings were with the help of Autocad and 3-D Max software. The drawings of existed Sankheda Sofa Chair with Plan, Elevation and Side Elevation were designed. And the drawings of proposed Sankheda Sofa Chair with Plan, Elevation, Side Elevation and 3-Dimensional view were also designed.

Results and discussion

This section covers the dimensions of the existing Sankheda Sofa Chair. For proposed designing of Sankheda Sofa Chair anthropometric measurements were consider.

The researcher had proposed one modified design of Sankheda Sofa Chair. i. The researched developed an ergonomic checklist for existing Sankheda Sofa Chair found the following. The breadth of existing Sankheda Sofa Chair seat is 20” inch only found by the researcher. For sitting of user with heavy bottom wider seat is required. Therefore the seat breadth for the proposed sofa chair was increased so as to fit the widest bottom width and knee to knee width to sit comfortably. So the researcher suggested breadth should be increased to 26” inch. ii. The researcher also purposed an increased in the backrest breadth to match with new seat breadth. The researcher proposed 26” inch backrest breadth. The researcher proposed in the new design a neck rest to support the neck and head of the user. The neck support has 2” thick cushion to support the skull. iii. The backrest angle was 100° degree to the horizontal. It was not proper for relaxation. According to Keegan and Akerblom the angle between seat and backrest should be between 105° to 110° for a comfortable chair^{3,4}. The angle of backrest was increased to 100° to provide relaxation to the user at home. iv. According to ergonomic checklist OSHA ergonomic checklist the armrest height should be between 8” to 12” inch. The armrest height was 5” in existing Sankheda Sofa Chair. The researcher recommended the armrest height should be increased to 8” inch. v. The researcher suggested the armrest breadth to increase to 3” inch for comfortable support for the lower arm. In the existing sofa chair it was having circular shape with 2” diameter. It was not able to provide support for lower arm. vi. The researcher had suggested other changes in the dimensions

of Sankheda sofa chair which are given below. The researcher had also provided two dimensional drawings of existing measurements of Sankheda sofa chair and proposed Sankheda sofa chair. The drawings were made exactly to scale with the help of Autocad and 3-D Max software. The proposed modifications were suggested by the researcher were as follows:

Table-1: Vertical Dimensions of Sankheda Sofa Chair

Vertical Dimensions	Existing dimensions Sofa Chair	Proposed dimensions Sofa Chair
Height	3’-2”	3’-6”
Seat Height with cushion	16”	16”
Backrest Height without design	16”	2’-0”
Backrest Height with design	26”	2’-10”
Backrest design	10”	10”
Height of Armrest	5”	8”
Height of Legs	12”	14”
Seat Cushion Thickness	4”	4”
Angle of the back and seat position	100°	110°

Table-2: Horizontal Dimensions of Sankheda Sofa Chair

Horizontal Dimensions	Existing dimensions Sofa Chair	Proposed dimensions Sofa Chair
Breadth of the backrest with design	2’-4”	2’-8”
Breadth of the seat and backrest	1’-10”	2’-2”
Seat depth	22”	26”
Armrest depth	2’-2”	2’-5”
Armrest width	2”	3”
Back Cushion thickness	4”	4”
Leg diameter	3”	3”
Upper design breadth	12”	16”
Total length + breadth + height	32”+28”+38”	36”+32”+42”



Figure-1: 3- Dimensional Drawing of Proposed Sankheda Sofa Chair.

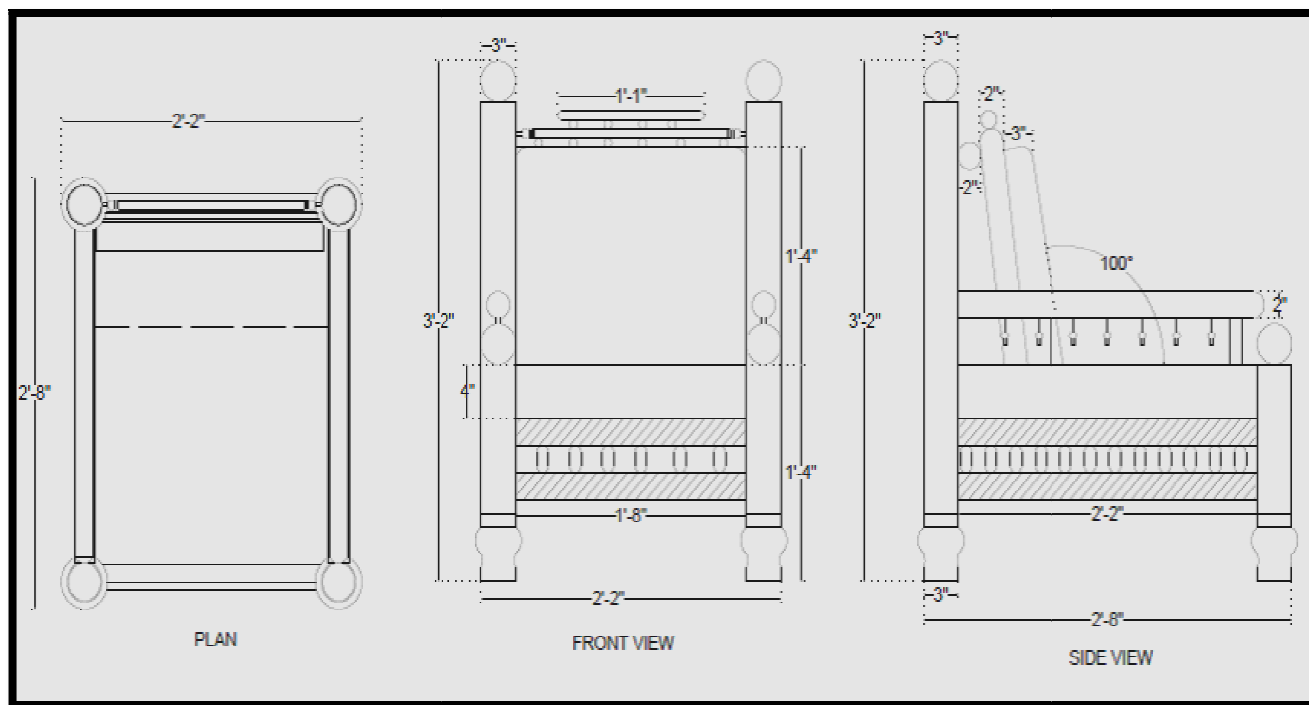


Figure-2: Existing Design of Sankheda Sofa Chair.

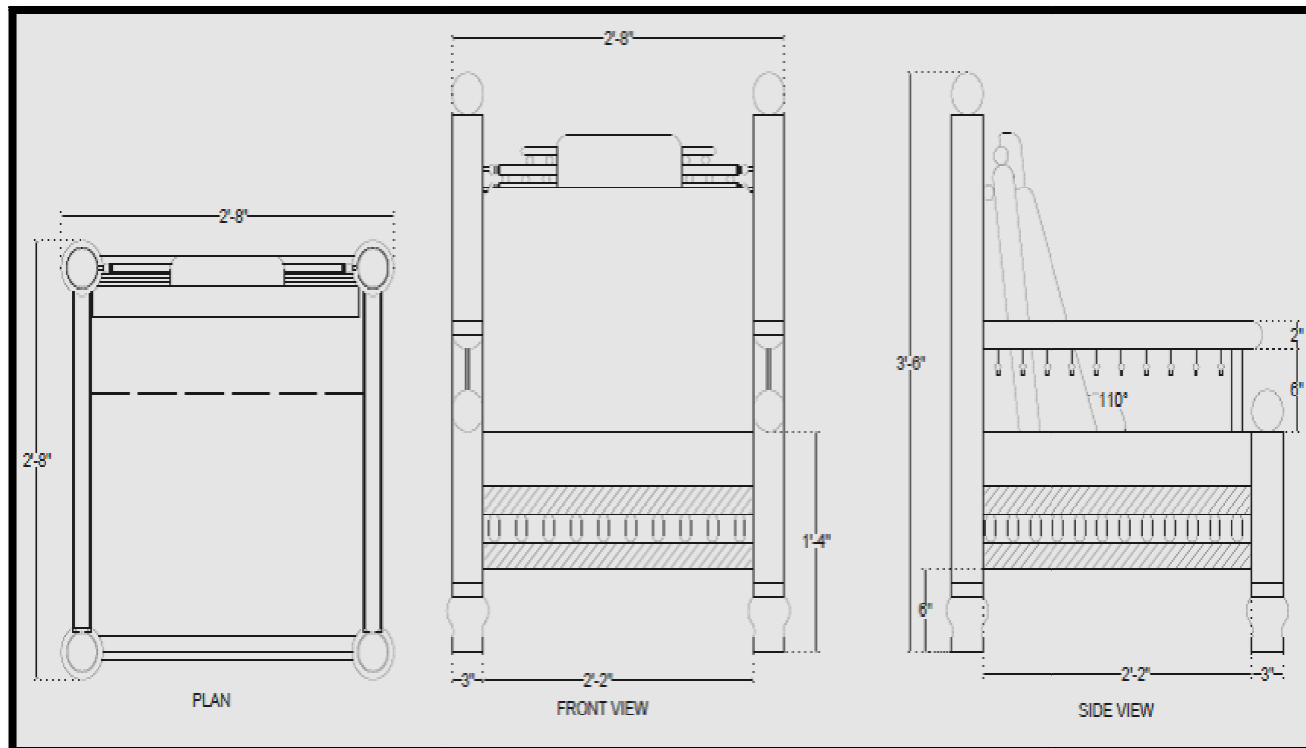


Figure-3: Proposed Design of Sankheda Sofa Chair.

The researcher proposed design the dimensions with the help of ergonomic checklist of chair from print and electronic (media) sources. With the help of software called 3-D Max the researcher had designed a 3 dimensional drawing of proposed Sankheda sofa chair.

Conclusion

The modified functional designs for Sankheda sofa chair were thus presented through plans, elevations and 3-D views. The dimensions in designing of Sankheda Sofa Chair would enhance its utility and it will increase the comfort level of user. The findings of the present study would serve as a valuable reference material for developing historical and cultural heritage design projects and other design projects in general. While promoting a base to design other new interiors it would also assist to create the samesankheda furniture in other commercial as well as residential interiors.

References

1. Mala Chandrashekhar (2016). The Cultural Heritage of India.
2. Etienne Granjean (1982). Fitting the task to the man, An Ergonomics approach *Taylor and Francis, London*.
3. Keegan J.J. (1953). Alterations of the lumbar curve related to posture and seating. *Journal of Bone Joint Surgery*, 35(3), 589-603.
4. Akerblom B. (1948). Standing and Sitting Posture. Stockholm.
5. Briger R. (2008). Introduction to ergonomics *McGRAW HILL Inc., New York, 548*.
6. Sheth Vivek, Reddy Pratyusha, Das Shमित, Pandey Abhijita (2016). Gaatha Home.
7. Charles Sturt University (2015). Workstation Ergonomic Self – Assessment.
8. Michael Patkin (2001). A Check-List for Handle Design. *Ergonomics Australia On-Line, 15(suppl)*.
9. Kothari C.R. (2004). Research Methodology: Method and Techniques. Wishwa Prakashan, New Delhi.