

# Modern Conceptual Home Design Based on Luban Lock Structure

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**Abstract:** This paper combines Luban lock structure with modern home design, and designs a set of home design which can be combined and deconstructed manually by using Luban lock structure. The modern home designed in this paper can also be disassembled according to personal needs and hobbies, and assembled into a new product form, which improves the manipulative ability of modern people. At the same time, it also satisfies people's psychological emotional needs and product interaction between people and things. The modern home designed in this paper can be displayed indoors or in public space as an ornament and sculpture on the basis of its original functions.

**Keywords:** Luban lock structure; Structure combination; Innovation furniture

## 1. Introduction

Luban lock is an element of Chinese traditional culture, which can be played and watched. Because of the different design concepts of Luban locks in different regions, the structural combination is also different. Luban lock is generally a wooden structure, which looks like a block cube. Luban locks are usually easy to disassemble and difficult to assemble<sup>[1-3]</sup>. When assembling, we need to master the assembly skills of mortise and tenon, think carefully and analyze its internal structure. The whole disassembly process is beneficial to flexible fingers and developing brain power, and is a good educational toy. With the rise of traditional culture and intangible heritage culture industry, integrating Luban lock into modern home design is not only to retain the essence of traditional culture, but also to innovate traditional culture<sup>[4-5]</sup>.

## 2. Design source

The modern home design of this design is mainly an extension of Luban lock structure. Through preliminary investigation, it is found that people do not have a comprehensive understanding of traditional culture, and they will not take the initiative to understand that Chinese traditional cultural elements and modern home products are closely connected with people's lives<sup>[6,7]</sup>. In order to meet people's psychological needs and integrate home products with traditional cultural elements, the design orientation is a modern conceptual home design that combines the structure of Luban lock, improves modern people's practical ability and meets people's inner needs. On the basis of combining the structure of Luban lock, this design also refers to the classical aesthetic viewpoint and layout form, adopts the special shape structure, tries to incorporate the irregular form, and adopts the unique and interesting form.

The extended innovative design based on Luban lock is to explore the significance of Luban lock to modern product design. They blend and influence each other, which makes it both cultural and interesting. On this basis, it improves people's hands-on ability, spreads knowledge through practice, enhances the spiritual value of home product design through structured innovation, and broadens the design ideas, thus further realizing detachable design, green design and modular design of products.

Luban lock has been handed down from ancient China, but not many people know it or can penetrate it. What I want to do is to combine Luban lock with modern home products. The reason why I choose modern home is because it is closely related to people's life. People can have a relatively deep understanding of Luban lock while enjoying the pleasure of home. Luban lock can be completely connected by their own structure without any external tools. Luban lock once gave it to German Chancellor Angela Merkel as a gift. It seems ordinary, but it embodies the wisdom of the Chinese people.

The tenon-mortise structure of Luban lock is more and more well known, and the influence of Chinese traditional culture is more and more profound. Because of the wide range of professional design, I often learn different styles and different ideas of design, such as membrane structure and origami structure, and it is more meaningful to design modern home design with this stale structure of Luban lock. At the same time, on the basis of design, we also studied classical aesthetic views and layout forms, adopted special-shaped morphological structures, tried to integrate irregular forms, and adopted unique and interesting shapes.

## 3. Design Concept

### Scheme 1

As shown in Fig. 1a, scheme 1 uses the most basic three-frame structure, and this three-frame structure is cyclically interspersed and accumulated to make various small and low coffee tables, small and high coffee tables and various high cabinets and low cabinets.

In this form, all kinds of homes are combined, and modern abstract thinking is expressed in various abnormal forms. It is interesting to change at will in the framework of rules. Show irregularities in rules, and show innovation in inheritance.

### Scheme 2

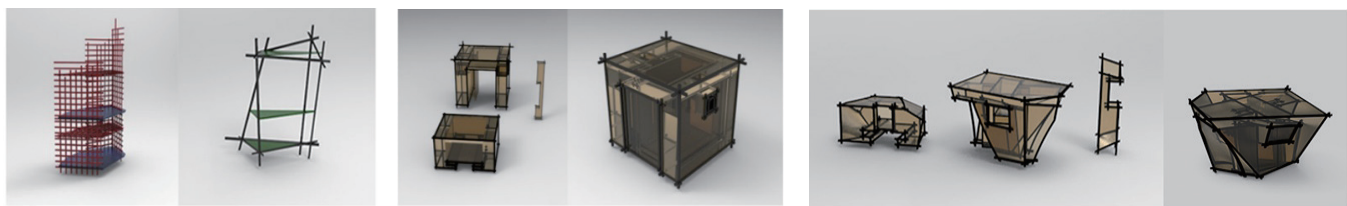
Scheme 2 uses the most common principle of three-way lock Luban lock on the basis of scheme 1, and changes it into a cube which is combined into a whole, and at the same time contains the internal structure of its three-way lock.

On the basis of the thread structure, the horizontal and vertical flat plates are crossed to show the face structure of layers, which is laminated. It is also possible to combine the thread structure with the surface structure, with surface wires. In the interconnection of the surface wires, it not only shows the internal structure of Luban lock, but also does not lose its unique modern home style.

### Scheme 3

On the basis of scheme 1 and scheme 2, scheme 3 is transformed from cube to various abnormalities. Irregular shapes are selected from various abnormalities, and the overall modeling is regular in irregularity. The external details extend the three-frame structure in Scheme I, and the overall combination extends the three-way combination form in Scheme II, which can lock the three together and reduce the transportation cost.

The change of the whole form breaks through the routine, is bold and special, eliminates the heaviness and rules, shows unique personality and creativity, and forms a contrast with the Luban lock structure which pays attention to symmetry and symmetry.



(a) Scheme 1

(b) Scheme 2

(c) Scheme 3

Fig. 1 Scheme 1 and 3

On the basis of the original three pieces, the whole home design can be disassembled and reconstructed, and assembled into new simple product forms according to individual needs and hobbies. This deconstruction process makes the use definitions of products varied, for example, a small part of them can be combined into new simple small tables, chairs and stools, which can be fully played by one's own imagination, giving people plenty of free thinking time, improving the hands-on ability of modern people in this process, and gaining a better understanding of the structure of Luban locks.

## 4. Material analysis of products

Metal square tube frame and colored transparent acrylic are used in the whole household design.

The metal frame can show the modernity and abstract form of the whole home. With the metal frame, the plug-in between the frames can be more obvious and have a three-dimensional effect. Transparent colored acrylic is selected. First, transparent acrylic can not be as fragile as glass, but also can be weighed relatively. What is important is that it can show the plug-in of internal structure, which has a stronger sense of modernity and presents the collision between surface and line as a whole. If you choose colored acrylic, you can choose your favorite color according to your personal preference.

## 5. Conclusion

(1) The Luban lock is regarded as a non-legacy and traditional culture, which is spread to people in a unique form, so that we can understand the tenon and mortise architecture, and carry out home design, which is to be integrated into our daily life, so that in today's information age, it will not be forgotten by people, but will be understood and loved by people.

(2) Through the design and production of modern conceptual home with Luban lock structure, we are familiar with the traditional cultural element of Luban lock, understand a series of design processes of product design, fully understand the design of cultural and creative home, and dig and analyze the field of modern home.

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