

ANALYSIS OF PROBLEMS IN CUSTOM FURNITURE DESIGN AND COMPUTER INTEGRATED MANUFACTURING SYSTEM IN HOME IMPROVEMENT INDUSTRY

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Abstract: Customized furniture has become a direction for those who pursue personalized and private home environments, but its variability is strong, and it is difficult to achieve "seamless" connection in the process of industrial production, which leads to the design of customized furniture in some home improvement industries. Differentiates from furniture products. This paper introduces the main characteristics of custom-made furniture in the home improvement industry, discusses the basic model of computer-integrated furniture manufacturing, specifically analyzes the connection between the design of custom-made furniture in the home-improvement industry and the computer-integrated manufacturing system, and puts forward targeted optimization of furniture design and computer-based manufacturing systems Three measures of convergence.

Keywords: Home improvement industry; Customized furniture; Furniture design; Computer integrated manufacturing; Problems measures.

When the people's material life reaches a certain level, the pursuit of high-quality life has become a form of self-expression of social value. Based on this, in addition to effectively improving the external environment, the improvement of the home environment in a private environment has also become a The focus of consumers' attention [1]. Customizing furniture and arranging home decoration styles according to one's own individual needs has gradually become a trend and trend in home decoration work.

1. THE MAIN CHARACTERISTICS OF CUSTOM FURNITURE IN THE HOME IMPROVEMENT INDUSTRY

In the past, the so-called "customized furniture" could only be seen in foreign movie blockbusters. When the concept of customized furniture was introduced into our country, it was quickly included in the ranks of luxury goods. In fact, this is a cognitive prejudice against custom furniture [2]. The reason why it is called customized furniture is mainly to hope that these furniture can be perfectly integrated with home decoration style and space environment, especially in many cities with relatively tight housing and living conditions, the use of customized furniture can maximize the use of limited space environment. From a cost point of view, custom-made furniture is more expensive than mass-produced furniture, which includes planning and design costs. If general materials are used as the main material of custom-made furniture, instead of Using precious or scarce wood, the price of these custom-made furniture is also equivalent to the middle price level, and ordinary consumers can also accept it.

2. BASIC MODES OF COMPUTER-INTEGRATED FURNITURE MANUFACTURING

With the comprehensive application of computer multimedia technology in furniture design and manufacturing, after the use of computer simulation to plan home improvement schemes, the design of customized furniture has gradually been put into commercial operation from a theoretical state.

The greatest convenience of computer-integrated furniture manufacturing is that in the computer multimedia virtual environment, the relevant dimensions of customized furniture can be adjusted and changed at any time in combination with changes in external actual conditions, which can reverse the defect that traditional customized furniture cannot change its size after it is finalized. , to minimize the error between the computer-synthesized home decoration and custom furniture synthesis scheme and the real scene effect, so that designers and consumers can fully display the design propositions of the home decoration environment and custom furniture, thereby improving the virtual scene and the real scene The degree of matching [3].

3. COHESION BETWEEN CUSTOMIZED FURNITURE DESIGN AND COMPUTER INTEGRATED MANUFACTURING SYSTEM IN HOME IMPROVEMENT INDUSTRY

Although computer programming can improve the precision of custom-made furniture in the production process, there are still some prominent contradictions in the connection between the design of custom-made furniture in the home improvement industry and the computer-integrated manufacturing system. .

3.1 Difficult To Control Irregular Size

Because some consumers have misunderstandings about custom furniture design, especially some young consumers who are not familiar with computers and related software.

In-depth understanding, simply think that all custom furniture design plans can be transformed into reality, so at the beginning of the custom furniture design, many personalized full-size furniture design plans are proposed, and some custom-made furniture products even completely subvert the consumption Readers' understanding of traditional furniture.

Although these design schemes can reflect the so-called "individualization" characteristics of custom-made furniture, and the design schemes can also be realized by means of computer software in the computer virtual environment, it is difficult to effectively implement these special-shaped sizes during the production process of furniture. Mastery, especially for those links that cannot match the design plan, will make these custom-made furniture and design plans have a huge contrast.

3.2 It Is Difficult to Reflect the Combination Effect

Due to the large number of members in the family environment, after the designer formulates the overall design style of the home decoration environment, different family members also have their own unique opinions on the home decoration style [4], and designers often put these opinions into custom-made furniture, hoping to bridge different needs. However, such a design method will have a huge impact on the color and line integrity of the custom-made furniture, so that the original combination effect of the custom-made furniture may not be effectively reflected, resulting in an embarrassing situation of "four different images".

3.3 It is Easy to Cause Product Color Difference

In the computer system, there are abundant colors to choose from, and some even have several color numbers as alternatives in one color, which allows consumers to review the home decoration design plan and the plane and 3D renderings of customized furniture, which can meet its needs to the greatest extent. However, in the actual production process of furniture, the paint materials that can be finally used on furniture are obviously less than the colors in the computer software library. Even after repeated toning, there is still a certain color difference between the design plan and the real object. May lead to consumer dissatisfaction.

4. MEASURES TO OPTIMIZE THE CONNECTION BETWEEN FURNITURE DESIGN AND COMPUTER MANUFACTURING SYSTEM

In order to effectively solve the obvious "decoupling" phenomenon in the process of connecting furniture design and computer manufacturing systems, researchers have carried out targeted research. Although limited by relevant technical conditions, many measures have not achieved obvious results, but they have effectively alleviated the current exposure. out of some problems.

4.1 Actively Adopt 3D Printing Technology

The effective application of 3D printing technology enables many furniture designers to use this new manufacturing technology to use many elements that are not easy to master in the process of designing furniture. This new manufacturing process is applied to furniture production, especially After the custom-made furniture is produced, the designer can accurately position the furniture customization that is integrated into the entire home decoration environment .

The chair completed with 3D printing effect may have subverted consumers' perception of traditional furniture. However, judging from this chair produced by advanced printing technology, the artistic value and personalized elements reflected in it are traditional furniture. Can't compare. From an abstract point of view, this chair is composed of many very small branches to form a structure with extremely rigid quality; from a concrete point of view, the structure of the chair is completed by independently floating points according to the algorithm of cloud reconstruction of [5].

4.2 Optimize the Design of Some Standard Furniture Components

The furniture manufacturing based on the computer integrated manufacturing system has created a great production problem for the so-called "workshop" traditional furniture manufacturers, but it has created an excellent opportunity for furniture manufacturing enterprises above the scale. Development Opportunities.

On the premise of effectively meeting the objective needs of consumers, the production process of some furniture parts can be separated from the traditional production process, so that the individual needs or claims of consumers can be met while fully conforming to the mainstream style of home decoration.

The furniture produced by the computer integrated manufacturing system has been able to form a relationship with the mainstream style of the home decoration environment.

A better match [7]. And it also incorporates many consumers' personalized propositions. The main reason why it can meet the consumption needs of consumers is that in the process of furniture design, furniture designers first classify and analyze the "special-shaped pieces", and use the angle changes in the space environment to change the angles of different levels. Become an important element in the effective connection of furniture links. And these are rarely manifested in the shape of furniture (as shown in Figure 3).

In all the manifestations of special-shaped construction, the computer integrated manufacturing system has standardized the production of furniture parts with the help of planning in the simulated environment, even if there are some so-called "special-shaped parts" that require customized processing[8], It can also make full use of blow molding, shaping and other processes to complete effective processing, and these components are completely placed in positions where the external shape is invisible, without affecting the overall appearance of the furniture. In this way, the possible impact of furniture parts on the appearance image during the manufacturing process of customized furniture products can be effectively solved. This kind of production and manufacturing process has been widely used in domestic home decoration custom furniture design. Some home decoration custom furniture representative enterprises in my country are focusing on these customized furniture production operations based on furniture design, production and manufacturing. It has been researched and developed aggressively, and has achieved relatively positive feedback in the end consumer market [9].

4.3 Adopt One-time Spray Paint Forming Technology

According to the traditional manufacturing process, after the shape of the furniture is completed, it needs to go through several different processes of painting and coloring, and then it can be put on the market after drying. With the continuous maturity of computer numerical control integration technology, the current painting process can basically be simplified into one process. In order to effectively solve the customer's requirements for furniture color coordination and the color difference between paints, it is necessary to combine different furniture wood materials and carry out appropriate processing on the wood surface. For example, the bottom real wood veneer can be finished with UV paint in the early stage. This is The factory directly processes the painted real wood veneer [10], at this time it can be regarded as a semi-finished product of customized furniture, and the durability and gloss of UV coating are much better than traditional spray paint, and there is no artificial problem such as color difference and uneven construction [11]. Then according to the customer's needs, after fully toning, choose the water paint that is exactly the same as the customer's requirements, and use the digital spray gun to complete the one-time painting in the closed environment of the CNC machining machine.

In particular, it needs to be emphasized that for the problem that the paint color of some key parts is inconsistent with the main color proposed by the customer, it can be avoided by covering up during the one-time painting process. After the paint coloring is completed, other colors can be painted. For multi-color custom furniture, the above steps can be repeated [12]. Due to the strict requirements on the light sensitivity of the paint surface and the surrounding temperature during the drying (drying) process, these steps need to be completed within 25~40 minutes, so as to effectively ensure the consistent color sense of the furniture[13- twenty three].

5. CONCLUSION

Customized furniture is a mainstream direction in the future furniture design and production process. Combining the important role played by computer multimedia technology in the integrated development of furniture production and manufacturing, it is bound to be able to transform furniture customization from meeting the needs of real life to improving art. The sense and aesthetic effect are extended, and the visual beauty of furniture is improved on the basis of satisfying the improvement of consumers' material living standards. Customized furniture designers should actively adopt 3D printing technology to optimize the design of some furniture components, and focus on solving the problems in custom furniture design that are difficult to grasp the irregular size, difficult to reflect the combination effect, and easy to cause product color difference, so as to realize the integration of customized furniture design and computer Create effective connections and design more and better customized furniture products for people.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose

REFERENCES

- [1] Zhang Xiao, Wu Qin, Yu Xin. The logic of cross-border subversive innovation of enterprises in the Internet era. *China Industry Industry Economics*, 2019(3):156-174.
- [2] Ma Yan, Deng Yingjian, Yang Chunmei. Discussion on the new model of small-scale custom furniture. *Forestry industry Industry*, 2018, 45(10):54-57.
- [3] Chen Xingyan, Tao Tao, Gong Yao. Design and application of custom-made furniture based on special column house type. *Forest Products Industry*, 2018, 45(9):44-47.
- [4] Chen Hong. Practice of C2B Intelligent Manufacturing in Furniture Industry. *Enterprise Management*, 2017(10): 105-107.
- [5] Liu Lin, Qiu Songqin, Zhang Ruiqiu. Research on the Design Model of Small Household Furniture Based on Hall's Three-Dimensional Structure Research. *Packaging Engineering*, 2017,38(16):133-136.
- [6] Ren Shuqin, Zhao Dongjie. Research on Standardized Design of Solid Wood Customized Cabinet Furniture. *Ju She*, 2019(35):90-92.

- [7] Zhang Lina, Li Zhongqiu, Zhou Dayong, etc. Comparison of furniture standardization systems at home and abroad. *Guangdong Chemical Industry*, 2018, 45(6):151-153.
- [8] Zu Guihua, Han Yonghong. The development trend of customized furniture in the home decoration industry. *Jiaozuo University Journal*, 2019(4):54-56.
- [9] Dong Lu, Liu Jun. Cost accounting of customized furniture enterprises based on ERP system. *E-Commerce Journal of Foreign Affairs*, 2019(12):52-54.
- [10] Liu Jun, Ma Ping. Research on optimization of sales return status of customized furniture enterprises based on ERP/MES. *Economic Research Guide*, 2018(29):106-108.