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Research on the Weight of Factors in Interactive Space Experiential Interior Design Based on Environmental Protection and Energy Conservation

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Abstract:

From the perspective of "green demand" of indoor space users, this paper discusses and considers the related problems of indoor space design. The green demand of users is the premise and foundation to realize the green development of interior design. To fully tap and cultivate the green needs of users, we need to experience the green indoor space. It is necessary to fully consider the rationalization of building space structure in the design, learn from the traditional ecological and energy-saving building technology, and choose the natural lighting and natural ventilation of the building to the greatest extent. This paper analyzes the methods of using renewable energy according to the local natural environment, selecting environmental friendly decoration materials, reasonably carrying out indoor greening and creating a sustainable indoor space environment with ecological beauty. The experiment shows that this method has a certain reference value for the indoor design and research of environmental protection and energy-saving interactive space experience..

Keywords: Environmental protection and energy conservation, green building, interactive space experience, interior design.

1. AIMS AND BACKGROUND

With the continuous development of China's economy, the traditional pattern of China's residential interior design makes the construction energy consumption increase continuously. China's residential interior design must be changed from extensive to intensive with low energy consumption, low pollution and low emission, so as to effectively slow down environmental problems such as global warming[1]. Therefore, China's low-carbon residential interior design is the demand of China's low-carbon economic development and the inevitable trend of future residential interior design[2]. With the change of people's ideas, the design connotation contained in the building process of residential interior design has undergone rapid changes[3-5]. Under the background of "low-carbon" macro-economic environment and people's "low-carbon" consumption consciousness, the innovative design concepts and methods of residential interior decoration are further discussed[6]. In low-carbon design, new technologies, new materials, new energy and other factors are used to achieve low-carbon emissions in residential interior design with the goal of saving energy, materials and water. Indoor low-carbon design is a new topic that interior designers should focus on and think about.

2. EXPERIMENTAL

2.1 ELEMENTS OF RESIDENTIAL INTERIOR DESIGN BASED ON LOW CARBON CONCEPT

The basic requirement of low-carbon furniture is to fully consider the evaluation indicators of products in the whole life cycle of furniture, so as to meet the use functions and spiritual functions of health, safety, comfort and environmental protection, low-carbon and environmental protection, and use natural, renewable resources and degradable low-carbon raw materials as much as possible. Furniture products that can be recycled or recycled with low energy consumption through design. Low carbon furniture is an innovation of furniture product design, which is not only an environmental protection furniture product in a simple sense[7-8]. Therefore, low-carbon furniture needs to be completed from design, materials, production, packaging, recycling and other aspects to prolong the life cycle of furniture products[9]. As an indispensable part of low-carbon furniture, low-carbon materials have different production energy consumption and carbon emission. Among the traditional furniture materials, taking wood, glued wood, aluminum and steel as examples, wood has the lowest energy consumption, the highest carbon sink and the lowest carbon emission. However, with the increasing lack of social resources, we must develop more new materials that can be widely used in the furniture industry. For example, corrugated furniture is a new type of paper furniture on the market[10]. Through structural design, its load-bearing can reach the standard consistent with traditional furniture (Figure 1). However, its weight is only one quarter of that of traditional furniture, and it can be recycled for dozens of times, far exceeding that of traditional furniture. There are also natural materials such as bamboo, rattan, straw, water grass and corn skin, which can also be applied to the design of low-carbon furniture through art and technology.

Fig. 1. Corrugated furniture

Soft decoration, that is, all movable elements in commercial space and residential space are collectively referred to as soft decoration. With the enhancement of people's awareness of environmental protection, people begin to yearn for natural materials and natural lifestyle. The author suggests emphasizing the application of natural colors and natural materials and adopting folk art techniques and styles. On this basis, we will continue to make efforts to "return to nature", create new texture effects, and use abstract design techniques to make people associate with nature. Therefore, the indoor furnishings should be flexibly arranged and properly beautified and decorated from the actual living conditions, so as to reasonably arrange some necessary living facilities and have a certain activity space, so as to make the room layout practical, beautiful, complete and unified.

In the interior low-carbon design of residence, according to the form of natural lighting, it can be divided into side window lighting and skylight lighting. Since most residential buildings are high-rise buildings, skylight daylighting has limitations, so side window daylighting is the main form of daylighting. Daylighting should be considered in architectural design, and its effects on volume, room height and depth, plane arc, window form, structure, materials and structure should be taken into account in design. The design of windows should be open as far as possible, which has the dual functions of daylighting and ventilation, which is more conducive to energy conservation and environmental protection; The rung of the window should be moderately widened, and then adjusted to be at the lower part in the middle of the window, so as to appropriately block the area with high illumination, and solve the problem of uneven illumination at the same time. And reduce the distance between windows and walls as much as possible to reduce non-uniformity (Fig. 2).

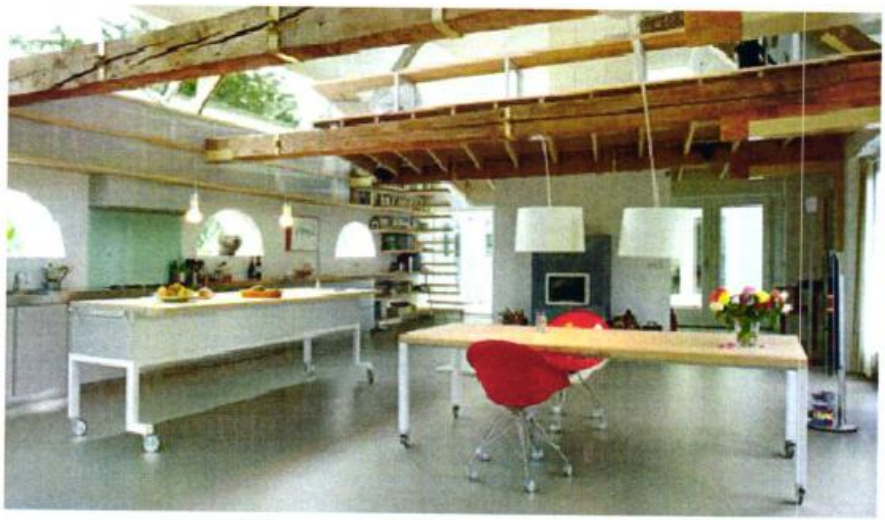

Fig. 2. Natural daylighting

In modern home, more and more people begin to start with soft decoration and break through the traditional decoration, such as using simple curtains with heat insulation and sunscreen function to create a cool summer home. In addition to the

decoration of the West drying room with thermal insulation materials, the soft decoration on the windows is particularly important. Because glass is the most difficult material to insulate, the sun can shine into the glass unscrupulously, and the dazzling sun will make the room on the West more hot and dry. On the one hand, through the color and style of curtains, we try to create a visually cool and light feeling. On the other hand, we can start with the material of curtains, such as sunscreen and heat insulation curtains, so as to realize a cool summer home and improve the charm of space (Fig. 3).

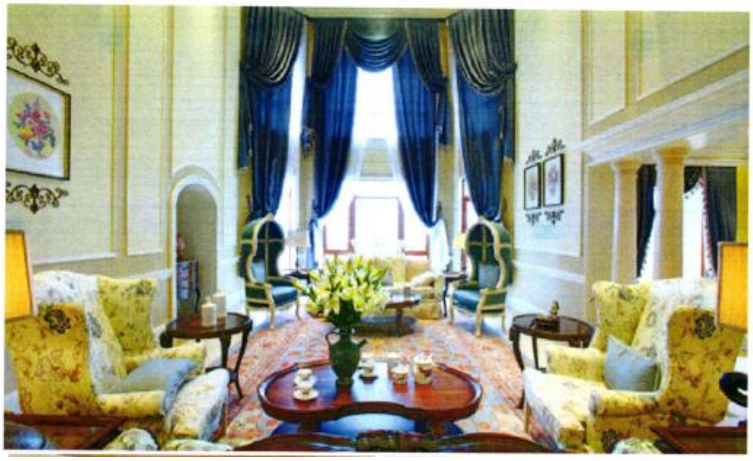

Fig. 3. Fabric soft clothing color matching design

2.2 FOREIGN ADVANCED EXPERIENCE AND REFERENCE

Europe, Britain, Japan and other countries have reached a mature stage in industrialized Prefabrication Technology. Industrialized prefabrication technology refers to the production of components and modules required for the construction of houses in the factory, and then transported to the construction site for construction. This has changed the traditional construction methods, reduced pollution emissions and reduced the use of wood. Housing industrialization has improved the reuse rate of steel formwork and other materials. As a result, construction waste and material loss have been reduced to varying degrees, recyclable materials have been increased, building energy conservation has been improved, and the construction cycle has been shortened. In China, although some cities and real estate manufacturers have seen cases in this way, there are still detailed problems to be improved. However, the trend of domestic low-carbon housing is closely following the international pace.

In the judgment basis related to building environmental impact assessment in China's current green residential interior design evaluation standards, there are only general requirements for building materials, and do not include the provisions on the environmental impact of the mining, production and transportation, construction and maintenance of raw materials and the final treatment process. This practice of focusing only on the properties of materials and not asking the source of materials has great disadvantages. However, the current green residential building standards do not require the evaluation of design life, and this situation cannot be distinguished. The whole life cycle method involves the comprehensive energy consumption and environmental impact indicators of the production process of building materials products, which has an important impact on the final evaluation results. Therefore, using the life cycle method of residential buildings can promote the technological progress of relevant building materials industry, promote energy conservation and emission reduction in the building materials industry, and guide people to choose materials with little impact on the environment. Therefore, China should strengthen the relevant research work as soon as possible, establish the whole life cycle evaluation method of residential buildings, and scientifically and reasonably evaluate the impact of residential interior design materials on the environment.

Low carbon concept has penetrated into various fields of residential interior design, living environment, lifestyle, new environmental protection energy and transportation mode. Through practical cases, the empirical value is converted into laws and regulations. The concept of low carbon has been fundamentally implemented. This is worthy of our study and reference, and it is also an aspect that needs to be improved. However, the low-carbon concept is more to fundamentally improve the lifestyle of residents, rather than relying entirely on new materials and high technology. It is not only to achieve the external insulation of the external wall, but to open the window to see the green everywhere and the blue sky in the field of vision. There is no need to affect people's enjoyment of life for the increasingly congested traffic.

3. RESULTS AND DISCUSSION

3.1 COUNTERMEASURES OF LOW CARBON INTERIOR DESIGN OF RESIDENTIAL BUILDINGS IN CHINA

The core of the low-carbon concept is to strengthen the research, development and promotion of energy-saving technology, environmental protection technology and low-carbon energy technology. China will adhere to the scientific outlook on development, implement the basic national policy of saving resources and protecting the environment, take the harmonious development of man and nature as an important concept, promote the coordination between economic development and population, resources and environment, and take the civilized development path of production development, affluent life and good ecology. The promotion of low-carbon concept needs the joint efforts of the government, developers, designers and consumers.

As a residential construction industry with high energy consumption, we must undertake the obligation of low-carbon energy conservation and emission reduction. The establishment of a perfect low-carbon housing evaluation mechanism is conducive to the good development trend of low-carbon housing in China. The standard setting of low-carbon housing evaluation mechanism is particularly important, including whether the interior design, construction, use of housing life cycle, demolition and transformation of housing consistently meet the requirements of low-carbon environmental protection, energy conservation and sustainable development are factors that need to be carefully considered. Residential interior low-carbon design is the inevitable choice to build a resource-saving and environment-friendly society. China's residential interior design should follow the principles of environmental protection, low-carbon and energy conservation, design, construction and use, and run through the concept of low-carbon in every link. At the same time, it is also a way to maintain the earth we live together and take practical actions to improve our living environment.

In the field of low-carbon residential buildings, the research on incentive system at home and abroad is becoming more and more mature. The author suggests that the establishment of an effective low-carbon housing incentive system can be carried out from two aspects: material incentives and non-material incentives. The incentive system and incentive procedures need to be further improved. In terms of economic subsidies, the state has issued relevant policies to assess renewable energy and energy-saving technologies. On the other hand, policies such as tax reduction and exemption, low interest loans, concessions and exemptions are conducive to the better participation of enterprises and consumers. Various incentive policies have been issued for production enterprises and construction units, such as cash subsidies, construction area incentives, administrative incentives, etc.

3.2 DEVELOPMENT TREND OF LOW CARBON INDOOR DESIGN IN CHINA

Residential indoor low-carbon design conforms to the trend of the development of the times and the needs of social people's livelihood, and is the further expansion and optimization of low-carbon energy conservation. The rise of low-carbon housing in China conforms to the strategic transformation of the world economic growth mode and has broad prospects. With the vigorous development of China's economy, China's real estate industry is facing integration and upgrading, and architectural design and interior design are becoming more and more professional and high-tech. The demand for all aspects of residential indoor low-carbon design is also higher and higher, which puts forward new requirements for its total operating cost, energy conservation and environmental protection, user experience and so on. The adjustment of energy structure and the speed of technological renewal are beyond imagination. Promoting residential indoor low-carbon design is the general trend and will eventually replace high consumption indoor design.

The standardization of residential indoor low-carbon design is to standardize the construction process and mode, the specification of materials and low-carbon emission indicators in the process of indoor design, and even the effect of universal and interchangeable design, that is, unified components can be used in different projects to form the recycling of components. Under the continuous application of the unification, generalization, systematization and modularization of indoor components, so as to improve the standardization of residential indoor low-carbon design process.

Residential interior low-carbon design is not a measure attached to the traditional design form, but also an organic combination of new planning and design ideas. As an interior designer, we should first accept the transformation of this way of thinking. The author believes that the indoor low-carbon design of residence means that the whole design, material selection, construction, energy consumption and the use process in the life cycle of residence should fully consider low energy consumption, low pollution and low emission. Although China's residential indoor low-carbon design still needs to be improved, its development prospect is broad.

4. CONCLUSIONS

China's residential interior low-carbon design is booming, which is closely related to the continuous improvement and support of its policy system, standard system and technical system. Under the background of low-carbon economy, the urgent task is to open up an effective method to solve the increasingly serious environmental problems and people's living environment problems on the premise of energy shortage and climate deterioration. The research on residential indoor low-carbon design described in this paper hopes to appeal to more experts and scholars to devote themselves to the research and exploration of low-carbon residential design, so as to create a bright prospect for the development of residential indoor low-carbon design under the background of low-carbon economy.

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