

Application of Green Design Concept in Interior Design Practice

Xiao Han*

Chongqing Energy College, Chongqing 402260, China

*Corresponding author: Xiao Han, 380503504@qq.com

Copyright: © 2022 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Parallel with the increasing development of China's social economy, many people are paying attention to the high-level design quality of interior design and the aesthetics and environmental protection of interior design. Therefore, the concept of integrating green design has become the focus of designers in the works of interior design. Based on the overview of green interior design concept, the author introduces the role and principles of green design concept in interior design, and discusses in detail the key applications of green design concept in interior design, hoping to provide reference and guidance for interior design practitioners.

Keywords: Green design concept; Interior design; Application

Online publication: May 30, 2022

1. Introduction

The advent of "great environmental protection" era requires interior designers to scientifically integrate the concept of green design into the practice of interior design, and infuse the green environmental protection design for heating, ventilation, and air conditioning (HVAC) system design, ventilation design, indoor layout and furniture furnishings, so as to create a healthy, comfortable, environment-friendly and healthy living space. Qiao^[1] analyzed the practice of interior design based on the concept of green design, pointed out the problems existing in interior design at this stage, such as overemphasis on luxury and novelty, excessive use of synthetic building decoration materials, and serious material waste caused by excessive pursuit of popularity in design, and believed that in order to achieve environmental protection to a greater extent and well-being of interior design, we should fully integrate the concept of green design under the advocacy of the concept of green environmental protection, so as to further reduce energy consumption and improve indoor comfort and environmental protection, as well as maximize the development of China's interior design industry toward green and environmental protection.

2. Overview of green interior design concept

Interior design is not only the extension of architectural design, but also the re-creation of indoor space and environment. Therefore, its main goal is to create a healthy and comfortable living environment for people through the practice of green design and meet the physiological and psychological needs of owners. The practice of interior design based on the concept of green design can make interior design more economical, with richer design elements and more environmental protection benefits. Therefore, all designers are called on to realize the harmonious coexistence between man and nature through the scientific application of green materials and new, advanced technology, so as to create a pleasant ecological living space^[1].

3. Practical significance of interior design based on green design concept

3.1. Improving the utilization rate of effective living area of indoor space

Interior design based on green design concept can effectively improve the utilization rate of indoor space. In the process of interior design, designers can employ the green design concept into all aspects. At the same time, they can also divide the interior space according to the golden section principle to avoid the waste of interior space ^[2]. Optimizing the indoor area utilization can not only facilitate the selection of furniture, but also make the space arrangement more reasonable. During interior designing, designers need to adjust the internal layout in combination with people's indoor movement track and living habits, so as to ensure humanization of interior design and promote the improvement of indoor environmental comfort ^[3].

3.2. Enhancing the practicability of indoor space

During interior designing, designers scientifically integrate the green design concept in combination with the characteristics of building structure, which must be based on its practicability. In the specific design practice, designers should pay attention to the layout of indoor façade and ground, and ensure that the range of indoor available space is further increased by adjusting the size of building decoration materials. In addition, we should select a good interior decoration to ensure that the interior design meets the needs of people's daily life and reduce pollution. For example, when using green plants for interior decoration, it can not only purify the air and reduce pollution, but also effectively avoid the waste of resources and effectively improve the use value of houses ^[4,5].

3.3. Improving the safety of indoor space

When designers carry out interior design according to the green design concept, they must take safety into account. The interior design of green design concept is mainly reflected in the quality of decoration materials and furniture. First of all, driven by the concept of green design, we should try to choose green environmental protection materials in the selection of home decoration materials. These materials should contain trace formaldehyde or better, zero formaldehyde, so people can live at ease. Secondly, in the selection of furniture, we should weigh less on the price of furniture, but instead, choose furniture with good quality and environmental protection performance as well as high safety performance ^[6].

3.4. Creating a more comfortable and healthy living environment

Interior design based on green design concept requires designers to reduce the application of harmful materials to human body as much as possible when selecting interior decorations, so as to create a natural, fresh, simple, elegant and low-carbon living space. In addition, the main intention of having an interior space based on the green design concept is to relieve people's emotions, create a more comfortable and pleasant environment, and play a positive role in promoting people's happiness ^[7].

3.5. Improving the ecological environment

At present, China's interior design is still in the initial stage of development. It often makes designs contrary to the ecological concept in interior design, which leads to not only excessive decoration, but also causes certain environmental pollution. Therefore, designers are called upon to strengthen the understanding of green design, pay attention to the integration of green concept in interior design, try to take green environmental protection as the premise in the formulation of design scheme and the selection of decoration materials, and improve the ecological environment on the basis of fulfilling people's living needs ^[8].

4. Basic principles of green interior design

In order for the interior design to meet the development needs of green buildings, we should improve the design requirements, that is, carry out the design work on the premise of meeting the basic principles of green environmental protection, energy conservation and consumption reduction, recycling and so on.

4.1. Green environmental protection

Environment friendly society is the general goal and requirement of architecture put forward by contemporary people under the condition of serious environmental pollution. Under this objective, the interior design should meet the requirements of green environmental protection and create a natural, comfortable and environment-friendly indoor environment ^[9]. Firstly, in terms of material selection, the application of chlorofluorocarbons should be reduced as much as possible to reduce the environmental pollution caused by refrigerants and urban heat island effect. Secondly, it is necessary to strengthen the application of green building decoration technology and adopt high-tech modern building decoration technology to achieve the goal of green environmental protection in interior design.

4.2. Energy saving and consumption reduction

The operation of indoor building system consumes a lot of energy and aggravates the phenomenon of energy depletion. In order to properly solve such problems, we should apply renewable energy as much as possible in the design, such as solar energy, geothermal energy, etc. At the same time, we should focus on the application of energy-saving technologies, such as frequency conversion technology and intelligent technology, and adjust the operation parameters of the air conditioning system according to the building environment and climate conditions to avoid the full-load running of the indoor facilities and equipment, thereby achieving the goal of energy conservation and consumption reduction ^[10].

4.3. Recycling

In order to meet the requirements of green interior design, designers can divide the interior into different functional areas and then implement independent design. The advantage of this approach is that even if there is equipment failure in one functional area, other functional areas will not be affected. Aged components can be recycled and reused, which effectively improves the utilization rate of decoration materials ^[11].

5. Applications of green design concept in interior design

In order to make the interior design of housing more ecological, we should pay attention to the integration of green ideas (such as in the aspects of decorative materials, indoor space layout and renewable resources utilization), realize the building functions, fulfill people's living needs, and improve the environmental protection benefits of buildings.

5.1. HVAC system design

The main function of HVAC is to realize indoor heating, ventilation and air conditioning. Therefore, the design level will directly determine the comfort of indoor space. Generally speaking, the energy-saving design of indoor space HVAC also has the following advantages: (i) It can promote the effective improvement of the owner's quality of life and make people's work and life convenient; and (ii) The development of HVAC energy-saving technology is closely related to the national energy conservation and emission reduction work. In the design of HVAC system, in order to ensure the accuracy and reliability of the design scheme, designers should strengthen the low-temperature radiant floor heating technology and improve the energy-saving effect on the basis of ensuring the efficient and economic operation of the air

conditioning system. For example, the application of traditional air-conditioning system requires the exchange of human temperature and humidity to have even effect on the whole room; therefore, there are high requirements for air temperature. However, the use of energy-saving air-conditioning system makes it possible to achieve the energy-saving goal of building HVAC system as the air temperature drops significantly, and the radiant heat also has energy-saving function. In the past, the building HVAC system mainly used three-dimensional radiator heating. Because the radiator is close to the wall and far from the center of the room, the heating in the room is uneven. Through the scientific application of low-temperature radiant floor heating technology, the coil is buried under the floor. After starting the system, the whole room is evenly heated, and the heat is increased by convection, which makes people feel comfortable, warms people's feet, and have a positive impact on human health ^[12].

Renewable resources are inexhaustible and have tremendous environmental benefits. Therefore, the development and application of clean renewable resources should be strengthened in the design. There are many kinds of renewable resources, including solar energy, wind energy, and geothermal energy. Solar energy has the function of providing heat energy to the building interior. With the continuous development of solar heat collector, the application of active solar heating system becomes possible. The function of natural air cannot be ignored. When there is a large difference between indoor and outdoor temperatures, the HVAC system can be started to realize the exchange of indoor cold and warm air. When the outdoor temperature is lower than the indoor temperature, the heating scheme should be started to collect the outdoor air source, or make cool storage at night ^[13]. The scientific utilization of natural wind can not only save electric energy and reduce pollution, but also effectively improve indoor air quality. Therefore, paying attention to the application of wind energy is also an effective way in the energy-saving design of building HVAC. The application of groundwater is based on the thermal insulation characteristics of groundwater bottom layer. Groundwater is used as a cold source, and the surface shallow water source is used to absorb solar energy and geothermal energy, so as to form low-temperature and low-level thermal energy, and then realize energy conversion through a small amount of high-risk electric energy input. However, in the conversion process, attention should be paid to water quality protection and the application of reinjection technology.

5.2. Indoor ventilation design

As people pay more and more attention to residential safety, interior designers should strengthen the green design in indoor ventilation design to improve the level of indoor air quality. In order to achieve this goal, designers should scientifically integrate the green design concept, fully consider the ventilation requirements, flexibly select the design scheme according to the indoor space pattern, and give full play to the advantages of natural wind. When the interior design work is limited by space, it is necessary to fully rely on auxiliary equipment to create a good air environment for the interior space.

5.3. Treatment of indoor light environment

People mainly realize information acquisition through the visual system. However, in order to make the visual system work, we must rely on light. Therefore, in the practice of interior design, we need to deal with the indoor light environment scientifically and reasonably. The indoor light environment is mainly composed of natural light and artificial light. Through the analysis of the practical experience of indoor design, natural light plays a positive role in promoting human health and has the advantages that artificial lighting does not possess. In the past, it is necessary to make full use of the natural light in the process of indoor lighting. Therefore, it is necessary to make the greatest use of the natural light in the process of indoor lighting ^[14].

For the environmental treatment of artificial lighting, firstly, it is necessary to reasonably arrange the lamps and pay attention to the selection of energy-saving lamps. Secondly, it is necessary to improve the lighting control mode to cut down excessive heat generation so as to save energy and meet the requirements of green environmental protection design concept.

5.3.1. Arranging lamps reasonably

Reasonable illuminance should be determined first in lighting design. Reasonable lighting mode should be selected in the layout of lighting lamps. General lighting, local (or key) lighting, uniform and symmetrical layout, appropriate distance-height ratio and so on should be adopted according to zoning, grouping, business, non-business, day and night. Places with good natural lighting should make full use of natural light. The lamps should be arranged in zones according to the characteristics and time periods of lighting use, and the number of lighting switches should be appropriately increased in order to adopt zone time-sharing control mode.

5.3.2. Improving lighting control mode

According to the building characteristics, building functions, building standards, use requirements and other specific conditions of the building, the lighting system should be controlled in a decentralized, centralized, manual, automatic, economical, practical, reasonable and effective manner, so as to ease the application and create conditions for power saving ^[15].

(i) For rooms with small area, one lamp and one control or two lamps and one control should be adopted. For rooms with large area, the mode of multiple lights and one control should be adopted. When the room has uniform illumination requirements, the mode of control one between two can be adopted. When there is no uniform illumination requirement, it can be controlled by zones.

(ii) The lighting of staircases and walkways in residential buildings should be controlled by energy-saving self-extinguishing switch. The energy-saving self-extinguishing switch should apply the infrared mobile detection and optical control switch, and the emergency lighting should have the feature of forced lighting in case of emergency. The lighting of public buildings, such as corridors, halls, staircases, and other public places, such as schools, office buildings, hotels, shopping malls and other buildings, should be controlled centrally, and zoning and grouping control measures should be taken according to the building use conditions and natural lighting conditions. The lobby, elevator lobby and guest room floor corridor of the hotel adopt automatic dimming devices that regularly reduce the illumination at night. Control measures that can turn off some lamps or reduce the illuminance should be taken for the aisle of the hospital ward at night.

5.4. Reasonable layout of indoor space

The most important aspect in interior design is interior space, which is the key point in the whole design work. With the further improvement of people's awareness of environmental protection, people should scientifically integrate the concept of green design into the process of interior design, do a good job in the reasonable layout of interior space that combines people's living needs and habits, and pay attention to the "development" of interior space on the basis of people-oriented principle. For example, some space needs are only temporary, such as the decoration design of children's bedroom. The children's room will no longer be intended for taking care of children when they grow up. Therefore, in the design, we should pay attention to flexible design, make reasonable layout of indoor space, and constantly optimize the design scheme to meet the temporary and long-term functional needs ^[16].

5.5. Paying attention to the selection of indoor furnishings

In interior design, we should pay attention to the degree of green environmental protection of relevant furnishings and change the traditional concepts of paying too much attention to price, style and so on in the process of selecting interior furnishings. In terms of furniture selection, we should choose green furniture that is harmless to human health, such as solid wood furniture. We should also choose healthy and simple interior decoration, which can not only highlight the owner's aesthetic sense, but also deliver the environmental protection effect.

6. Conclusion

In short, the interior design based on the green design concept is the future development trend of the design industry under the background of the deteriorating ecological environment, and it is also the basis to ensure the green environmental protection benefits of interior design. Therefore, the related design personnel should fully understand the connotation of the concept of green interior design, according to the green environmental protection, energy saving, recycling and other principles of indoor air conditioning system, ventilation system, lighting system, space layout and furnishings for reasonable design. Through a variety of advanced technology and the application of green environmental protection material, we can promote a sustainable development of interior design.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Qiao C, 2021, The Embodiment and Application of Green Design Concept in interior Design. Home, 2021(22): 13-14, 20.
- [2] Zang H, Lin M, Song J, 2021, Research on the Application of Green Design Concept in Interior Design. Urban Architecture, 18(13): 35-37, 55.
- [3] Liu X, 2021, Research on the Embodiment and Application of Green Design Concept in Interior Design. Green Building Materials, 2021(03): 82-83.
- [4] Han X, 2020, Research on the Application Strategy of Green Landscape Design Concept in Interior Design. Home, 2020(18): 15-16.
- [5] Wei W, 2018, Research on the Application and Development of Green Design Concept in Modern Interior Soft Decoration Design, Xi'an Polytechnic University.
- [6] Yu Y, 2021, Application Analysis of Green Design Concept in Interior Design. FootWear Technology and Design, 2021(15): 103-105.
- [7] Guo W, 2021, Research on the Application of Green Design Concept in Small House, Jiangxi Normal University of Science and Technology.
- [8] Du H, 2020, Application Research of Color Ecological Design Concept in Interior Design. Digital World, 2020(05): 104.
- [9] Wang J, 2020, Research on the Application of Green Ecological Design Concept in Interior Design. Art Education Research, 2020(02): 66-67.
- [10] Song Y, 2019, Research on the Application of Green Ecological Design Concept in Interior Design. Juye, 2019(09): 13-14.

- [11] Liu K, 2019, Discussion on the Application of “Green Design” Concept in Interior Design. Home, 2019(18): 103, 159.
- [12] Zhan R, 2019, A Probe into the Dilemma and Optimization Principle of Green Design Concept in Interior Design. Home, 2019(13): 90.
- [13] Wei W, 2018, Research on the Application and Development of Green Design Concept in Modern Interior Soft Decoration Design, Xi’an Polytechnic University.
- [14] Wen X, 2018, Research on the Application of Green Design Concept in Indoor Environment Design, Wuhan University of Technology.
- [15] Li B, 2015, Exploration on the Application of Green Design Concept in Interior Design Practice. Journal of Huangshan University, 17(04): 97-100.
- [16] Zhang X, Zhu J, 2020, Research on The Implementation of Green Design Concept in Interior Design – Comment on “Research on Interior Environment Design Based on Green and Sustainable”. Environmental Engineering, 38(09): 265.

Publisher’s note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.