

Controllability of Interior Design of Green Ecological Residence based on Low-carbon Concept

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Abstract: Green ecological housing is a noteworthy issue in the current residential industry and the key to sustainable development of the construction industry. In terms of housing, the design of the indoor environment is even more important. The harmonious and efficient interior environment design brings comfort and comfort to residents, and emphasizes the rationality of the design. With the profound influence of China's scientific development and the concept of ecological civilization, people are becoming more and more interested in the current indoor environment design and environmental protection. We hope to promote the innovation and reform of China's indoor environment through the concept of ecological housing construction, and emphasize the design and development concept of harmonious coexistence between man and nature. The purpose of this article is to design the interior environment of green ecological residence under the concept of low carbon. This article proposes to improve the house through space environment, thermal environment and sound environment technology, and strengthen the effect of air, heat preservation and noise prevention. And through the questionnaire survey method, 300 questionnaires were sent to the community, and it was concluded that the respondents were concentrated in the age range of 25 to 45 years old. Therefore, the questionnaires collected this time should be representative. It can reflect the real situation of the community objectively. On the other hand, it shows that green houses are currently more popular among young people. In terms of monthly family income, they are basically between 6000 and 10,000 yuan. And in the process of survey, 90% of the respondents said that if the green house is more cost-effective, if the green technology used can be more practical and convenient to operate, and if the management is more perfect, they are very willing to spend more. More cost to buy.

1. Introduction

House is the building space on which modern residents live, and it is also an indispensable part of social development. However, in the current form, the development of China's construction market is not perfect, and the residential environment is also showing a changing state of change. Therefore, many residential environmental designs actually do not meet the requirements of the specification, causing serious safety to the residents' bodies. The threat will also have some negative impacts on the surrounding environment. Therefore, the concept of a green eco-house comes from operations. The core of this concept is to ensure the beauty of indoor houses and the safety and health of the environment. With the development of society and the improvement of living standards, people's demand for housing is getting higher and higher. The main concepts of green ecological housing are "green" and "ecological", which not only meet the high requirements of housing, but also meet the principles of sustainable development of the construction industry. The design of the indoor environment of a green ecological house is an important part of achieving "green" and "ecology". The interior design of the house includes five directions. Space environment design, air environment design, thermal environment design, acoustic environment design and light environment design.

Shuo Liu proposed to analyze and discuss the interior design of Wuxi urban complex from a low-carbon perspective, and comprehensively interpret design schemes such as energy saving, low consumption, and recycling in order to provide support for interior innovative interior design based on interior design. Low-carbon concept, and then seek theoretical support for the sustainable development of Wuxi urban complex [1]. YUAN Lei explained the connotation, characteristics and construction methods of green interior design. Starting from the origin of the green concept in interior design, the green design theory in ancient Chinese philosophy played an important role in the formation and development of traditional Chinese interior design. And its application prospect is prospected. Finally, the sustainable development of the green design trend is conducive to the physical and mental health of the indoor environment [2]. Wang Qiang proposed that by analyzing and summarizing the development trend and current situation of Chinese homestay families, and taking the development concept of low-carbon environmental protection as the starting point, he tried to study the design strategy and carbon concept of host families under low-carbon environmental protection. And through an in-depth analysis of the successful case of Moganshan Naked Heart Valley, the application of the low-carbon concept in households was explained [3]. With the guidance of extracting macro concepts and site selection as a reference for future residential design, the bureau's architectural design strategy, establishment of a meso-style, functional zoning, micro-space design, and energy-saving technology choices were proposed. The artistic design of the indoor environment of modern urban residences under the new situation is studied, and the people's demand for the indoor indoor environment design under the new situation is analyzed, as well as the design concept and development characteristics of the indoor indoor environment design at this stage [4-5].

This article proposes to improve the house through space environment, thermal environment and sound environment technology, and strengthen the effect of air, heat preservation and noise prevention. And through the experimental method of the questionnaire survey, 300 questionnaire surveys were sent to the community.

2. Method

2.1 Overview of the Core of Green Ecological Housing

The key to a green ecological house is focused on both green and ecological aspects. The core of its main idea is to create a high-grade house with the least pollution under the premise of minimal energy consumption. Green ecological housing is actually the implementation of the concept of sustainable development in the construction of housing, from the aspects of energy saving, land saving, environmental management, etc., to build environmental protection projects in line with the law of human development [6]. In recent years, due to the continuous acceleration of China's urbanization process, more and more township populations have flooded into major cities, which has brought tremendous pressure to cities, and the safety index of urban living environments has gradually decreased, and the ecological environment has also gradually Is in a deteriorating state [7]. From a residential perspective, more and more materials that do not meet safety requirements have entered the market and entered the production chain, posing a serious safety hazard to residents' personal safety. Therefore, in response to this problem, we must make every effort to reduce harmful substances such as formaldehyde in building materials, so as to protect the ecological, environmental protection and greenness of the living environment [8].

2.2 Space Environment Design

The focus of the space environment design is to effectively control the indoor air quality. There have been many cases of residents suffering from respiratory diseases due to the wrong selection of decoration materials, so it must be paid enough attention to. When choosing a residential location, people should first ensure that there are no large polluted areas around it, and secondly, they should choose green building materials as much as possible when renovating [9]. For designers, when designing the indoor environment, attention should be paid to the construction of the ventilation

system. In general, natural ventilation is safer and healthier than air conditioning and air pollution, and environmental pollution is almost negligible. Design a reasonable ventilation system based on orientation, spacing and layout.

2.3 Thermal Environment Design

Due to the urban heat island effect and the rising global temperature, we must pay attention to improving the thermal insulation and thermal insulation performance of the wall. According to practice, thick and multi-row whole blocks have superior thermal insulation performance. Fly ash, ceramsite and pumice stones can be selected as the basic materials of the blocks. In addition, you can also take advantage of modern building materials to erect EPC insulation boards on the outer wall, so that the heat insulation performance of the wall can be reminded [10-11]. Secondly, you can also reduce the area of holes in doors and windows to improve the heat insulation performance of doors and windows, but you must pay attention to the requirements of fire prevention.

2.4 Sound Environment Design

Noise is a source of pollution that plagues residents in modern cities. Therefore, attention should be paid to the design of noise when designing indoor environments. First of all, it is necessary to maintain a certain relationship between the living room and the kitchen, and avoid direct connection as much as possible. Secondly, the location of the bedroom should be avoided near the elevator shaft, and the water pump should also be kept a certain distance from the residential building, and appropriate sound insulation measures should be taken [12]. In the process of decoration, some wall materials with better sound insulation effects should be selected, so that the noise between each floor is controlled below 50 decibels, and the impact sound is also controlled below 65 decibels. When designing doors and windows, it is necessary to ensure the tightness of the doors and windows, and there should not be a large gap, which can also have the effect of controlling noise.

3. Experiment

3.1 Experimental Object

This article from the perspective of the indoor environment design of green ecological housing, based on the concept of low-carbon, based on the relevant realistic background and theory, the indoor environment design of green ecological housing in Wenzhou as the research object, to study the living conditions of green ecological housing.

3.2 Questionnaire Survey Method

A questionnaire is a tool for collecting data that is used to measure people's behavior, attitudes and social characteristics. The content collected is various materials related to people's social phenomena and social activities. According to the questionnaire, user information is obtained based on the situation of people's green ecological houses. Before the formal survey, pre-investigation should be carried out first, mainly to further determine the feasibility of selecting survey items, and to ensure the rationality of the questionnaire design. At the same time, it can avoid the issuance of a large number of invalid questionnaires due to some errors, which wastes time and costs. This study and March 4, 2019 randomly distributed 20 questionnaires to residents in the X community to understand whether they can understand the meanings of the indicators in the questionnaire and to ask them if they have other indicators. Not included in the questionnaire, the 30 households surveyed all agreed that the content and questions of the questionnaire were concise and appropriate, and acceptable, and the community's property management unit also expressed their support. This study started a formal survey from March 5, 2019 to March 9, 2019. It took 5 days to randomly issue questionnaires and interviews, and distributed a total of 300 questionnaires, and 276 were returned. For 92%, the questionnaires were checked and 11 invalid questionnaires were excluded. A total of 265 valid questionnaires were obtained. The effective rate was 88.3%.

4. Discussion

4.1 Introduction to Basic Data

According to the collected questionnaires, this study first collected the personal information of all respondents, as shown in Table 1 and Figure 1.

Table 1. Distribution of population by age and proportion

age	Under 25	25 to 35 years	36 to 45 years	46 to 55	55 years and over
People	15	116	86	40	8
percentage	5.7%	43.8%	32.5%	15.1%	2.9%

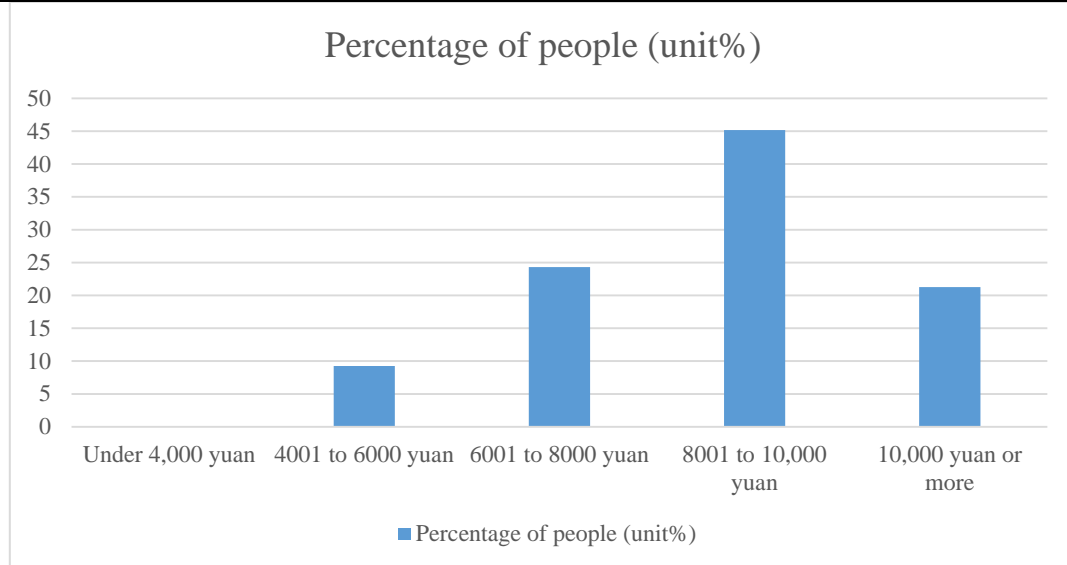


Figure 1. Resident income and number of people

Respondents have different demographics and have a significant impact on user satisfaction. As can be seen from the figure above, the respondents are between 25 and 45 years old. Therefore, the questionnaire should be collected and represented to a certain extent, which can objectively reflect the actual situation of the community. On the other hand, judging from the current monthly income of households, green houses are very popular among young people. The monthly income of a family is basically between 6,000 yuan and 10,000 yuan, and the monthly income of a few respondents is above 10,000 yuan. During the survey, 92% of the respondents said that if the greenhouse is more cost-effective, and the use of green technology will be more practical, more convenient to operate, and better managed. They will be very willing to spend more money to buy, which shows that the community is very suitable for green living user questionnaires.

4.2 Recommendations

(1) Pay attention to the location of the project. When selecting the project location, full consideration should be given to the ecological conditions of the surrounding environment of the residential area. Measure the levels of natural radionuclides and soil concentrations in the topsoil of the construction site. If the soil concentration is high, measures should be taken in the design to prevent the cracking of building foundations from causing pollution to indoor air.

(2) Reasonably choose green building materials. Buildings require a lot of building materials. There is an increasing interest in building materials and the health of residents. Defective building materials have seriously harmed the physical and mental health of residents. For example, stone containing radioactive elements and concrete antifreeze that produces antifreeze. Formaldehyde and thorny liquefied gas materials in decorative materials. Therefore, in the design of green buildings, on the one hand, we must vigorously promote the application of green building materials such as light steel structures, green high-performance concrete, fly ash bricks, plastic-steel doors and windows, and crop-based panels that are good for human health. At the same time, the national

environmental protection mark should actively use non-toxic, harmless, pollution-free environment, antibacterial and moisture-proof, constant humidity, air purification function, infrared function, forest function (negative ions) and other healthy building materials that are beneficial to the healthy environment or health function, For example, ED can be reused, recycled and regenerated.

(3) Increase indoor clear height appropriately. The clear height of the house also has a great effect on natural ventilation. The lower clear height of a house is not only frustrating, but also bad for indoor air circulation. According to the recommendations of environmental protection experts, only when the clear height of the house exceeds 2.5m, it is conducive to indoor air circulation and minimizes indoor air pollution. Therefore, in the design of the house, the indoor clear height should be appropriately increased without affecting other functions. For southern cities, the indoor clear height should be slightly higher. At the same time, it is not recommended to use ceiling decoration schemes for the living room and master bedroom during renovation.

5. Conclusion

Light is particularly important in environmental design. Sufficient light will bring a bright, open and open feeling to residents and lay the foundation for people to create a comfortable living environment. In order to emphasize the controllability of the light environment design of the green ecological house, the designer should make full use of the natural light of the indoor environment to increase the brightness of the interior design. In the design of lighting systems, solar energy was actively used. In order to reduce the negative impact of other energy consumption on the construction of green ecological housing. This article proposes to improve the house through space environment, thermal environment and sound environment technology, and strengthen the effect of air, heat preservation and noise prevention. And through the experimental method of the questionnaire survey, it is concluded that green houses are currently more popular among young people, and their monthly household income is basically between 6000 and 10,000 yuan.

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