

The Design Methods of Health Building in Residential Community

Jinghui Zhu

Shandong University of Arts, No. 6000, Ziwei Road, Changqing District University Science Park, Ji'nan, China

Abstract:

In recent years, the architectural design of residential community has developed rapidly, and has made great contributions to promote the healthy development of residential communities in China. As an important part of the construction project before road work, the development of healthy building design in the residential community not only concerns the image and development of the construction enterprise itself, but also lays a good foundation for the development of the construction field. Based on this, the article starts the research on the design of healthy buildings of residential communities. This article first elaborates the content of the health building design in residential architecture, then proposes the design index of health building, and finally studies the design methods of healthy buildings of residential communities. The main purpose of this research is to clarify the content of healthy building design in residential communities, and then advance the level of healthy building design to promote the stable development of the construction field.

Keywords: Residential community, Health, Architectural design, Green building

I. PREFACE

Residential communities are an indispensable part of people's daily lives, which affect people's physical and mental health. As an evaluation indicator for the healthy building design for residential community, it is mainly reflected in the construction environment, air quality, infrastructure, building materials, and domestic water and etc. The purpose is to create a green and comfortable residence. With the development of science and technology, people are paying more and more attention to health technology in building construction. Their design concepts directly affect the evaluation indicators of healthy building design in residential communities. As a direct beneficiary of a healthy building, the users' satisfaction should be taken as the most direct

evaluation target of building design, building a green, comfortable, high-performance residential building is an effective basis for improving the level of construction.

II. CONTENTS OF HEALTHY BUILDING DESIGN IN RESIDENTIAL COMMUNITY

The content of healthy building design in residential communities is mainly include the occupants' health, rational distribution of waste, environmental protection, and the conservation of resources, etc. Healthy housing is to promote health, comfort and safety in the living environment. In the process of implementation, designers should strictly follow the planning and design specifications, pay attention to people's mental health on the premise of ensuring the basic use functions, and ensure the health of the living environment, the affinity of the natural environment and the protection of the living environment and healthy environment. The several aspects have to coordinate jointly and development^[1]. The design content of healthy housing is mainly reflected in the following aspects: First, the integration of healthy housing and the natural environment; Second, the comfort of the living environment; Third, the perfect health and service system; Fourth, The disposal of garbage, sanitation and sewage in residential areas. The design concept of healthy housing needs considering in terms of safety, health, comfort and environmental protection. Safety is the first factor. Health issues are raised on the basis of safety. With the continuous improvement of people's quality of life, people also pay more attention to the comfort and environmental protection of the housing. That is, people are no longer satisfied with the physiological Demand for healthy housing, the spiritual requirements of new housing is continuing to increase. True health is not only reflected in physiology, but also in the ability to adapt to society and moral quality. Therefore, it is necessary to strengthen the richness of the design content of healthy buildings in residential quarters, and keep closer relationship between people and residences, and promote the development of healthy building design in residential communities.

III. THE DESIGN INDICATORS OF HEALTHY BUILDING IN RESIDENTIAL COMMUNITY

3.1 Sustainable Development Indicators

As one of the important design indicators of healthy buildings in residential communities, it has a sustainable green building campaign and is being launched globally. With the gradual emphasis on sustainable development by UN international organizations, more and more people have joined the team of sustainable development. It refers to the maximum utilization of environmental resources benefits on the basis of environmental resources. That is to say, the healthy building of residential community is based on the existing ecosystem bearing ability,

ensuring the rational use of the ecological environment and land, and maximizing the improvement quality of human life, thereby ensuring a virtuous circle of ecological environment. Using relevant green technologies, try to avoid the waste of natural resources and energy and convert the non-renewable resources into renewable energy. In order to meet the sustainable development indicators. For example, fitness equipments are set up in the community, and taking the per capita health level of the community as the indicator of sustainable development; the pollution of residential space should be avoided and the health of the users of the building protected; the environment of the residential area and the indoor space is coordinated well, and improving the mental health of the occupants.

3.2 Green Indicators

The green indicators is the core of building, and it is also a development strategy that conforms to China's basic national conditions. It not only has certain requirements for energy conservation and efficiency, but also achieves the highest utilization rate of energy for people's living space. The establishment of a sound green building management system requires reasonable planning, scientific design and development of buildings, and effective use and management of buildings in order to achieve healthy and comfortable work, activities and living space. In the effective life cycle of residential buildings, the efficient use of resources, the minimum impact on the environment, is the basic requirements of green building. As the concrete embodiment of circular economy in the construction field, green building is the development direction of the construction industry. Green building means that architects fully consider the requirements of environmental protection in design, construction and use, closely combine buildings with aesthetics, environmental protection, energy, planting industry and high and new technology, effectively meet various use functions, create physical and mental health beneficial to users, and create work and living space in line with environmental protection requirements^[2]. Therefore, in every aspect of architectural design, construction, and use, we must implement the concept of environmental protection and green building, connect environmental protection and high technology, and achieve a close link between energy and buildings to satisfy users' functional requirements, improve the physical and mental health of occupants, and create a green building that meets the requirements of green indicators. In the field of construction, the development requirements of green indicators for healthy housing mainly include: First, to strengthen the positive impact on the existing environment and the use of resources; Second, to improve the living standards of health and comfort. The third is to achieve harmony between human settlements and the natural environment.

3.3 The Indicators of Human Settlements Environment

Chinese culture is extensive and profound. In ancient times, the sages' love and respect for the nature can be described as unparalleled. Both Taoism and Confucianism are a good combination of the relationship between universe and people, and truly realize the best state of "Harmony between man and nature"^[3]. People long for harmony with nature and have a good living environment. On the other hand, compared to China's basic national conditions, China is a country with a large population, it is also constantly strengthening the emphasis on human settlements indicators in terms of environment and development. In 1994, our country proposed the route of sustainable development. Sustainable development concept has been formed under the coordinated development of population, resources, economy, society, and the environment. Among them, as an important part of this route, the sustainable development of healthy buildings in residential communities is embodied in six aspects of action:

The improvement of human settlements functions. Meet the basic residential function needs of users.

Every people has housing. Designers plan reasonably to meet people's basic needs for housing.

Infrastructure security. Provide users with infrastructure security required for residence.

Human settlements achieve urbanization management.

Continuously improve the urban comprehensive supporting system of residential buildings and realize the comprehensive control of intelligent design.

Strengthen the sustainable development of the construction industry and improve the environmental level of human settlements.

Avoid energy waste and increase resource utilization.

In October 2005, At the Fifth Plenary Session of the 16th Central Committee of the People's Republic of China, China announced the Eleventh Five-Year Plan and proposed the basic requirements for healthy buildings in residential communities, namely low consumption, low emissions, low input, high output, and energy efficiency. The cyclical sustainable development of the national economic system has further enriched the human settlement environment^[4].

IV. THE DESIGN METHODS OF HEALTH BUILDING IN RESIDENTIAL COMMUNITY

4.1 Reasonable Design of Building Space

When designing a healthy building in a residential community, the rational design of the building space must be considered firstly, and the space dimensions and the proportion of room configurations should be conducive to human health. In the arrangement of indoor functional spaces, it is necessary to clarify its use performance and design a functional space that conforms to the natural laws of the human body^[5]. It mainly includes the rationality of functional zone and the suitability of spatial scale. Secondly, we must consider the comprehensive needs of space, including 1 the design of safety requirement, such as setting up elevators to facilitate the elderly to go out, reducing unnecessary space obstacles, and perfecting the balcony guardrails; 2 the distribution needs of public areas and private areas, such as the private space, as well as the public space and so on.

4.2 Green Technology of Healthy Housing

In the process of designing healthy buildings in residential quarters, green houses are the core part of buildings. First of all, starting with the selection of building materials, it is an effective means to utilize the harmless building materials in the green technology. In the choice of building materials, the following should be very applicable:

Energy-saving thermostat building materials.

Through the storage of heat, the resources are fully utilized to achieve the purpose of effective temperature control.

Anti-bacterial building materials, such as green coating, daily supplies and composite wood flooring and so on.

Air purification building materials.

For example, then anometer, catalytic materials, etc. They can reach the adsorption of the harmful substances to achieve the purpose of improving air quality.

Anti-radiation and noise construction materials. Secondly, in the technical facilities of heat preservation, strengthen the design of internal and external heat preservation. In the materials selection of plastic heat retaining window, PVC material can be used to reduce outdoor noise and achieve anti-interference^[6].

4.3 Scientific Planning of Healthy Housing

Scientific planning is an important task in the design of healthy buildings. First, it is necessary to select a suitable construction site so that the residents can reduce their negative impacts during the site selection and improve the harmony between the environment and human. For the choice of construction site, the following points should be noted: the first is to choose a healthy land. The second is to select a site with high utilization rate of land resource and to fully transform the original infrastructure. The third is to select high quality land with plasticity, ensuring the plasticity of infrastructure and green area. The fourth is to choose a site with good air quality, low noise, and good quality of water. Second, we must emphasize the protection of the ecological environment, improve the level of natural environment and the utilization of natural resources. In the ecological balance planning, the following points need attention: First, try to avoid the original ecological damage to the construction site; second, assess the water quality of the construction site; third, take effective and protective measures to reduce the destruction degree of the natural ecological environment. A reasonable green building plan not only achieve a good ventilation of the house, but also a beautiful experience of warm winter and cool summer. Finally, it focuses on the construction of a humanistic environment. Residential buildings must be combined with the surrounding environment, setting reasonable building densities and heights in the construction of cultural landscapes. In terms of architectural forms, shapes and dimension, it must be combined with the urban space and cultural characteristics.

4.4 Make Full Use of the Surrounding Environment

In recent years, environmental problems and exploitation of resources have brought many challenges to current architectural design. These are some solutions and concrete implementation of improving current problems. First of all, making a effective integration is a good method to solve problems. Taking full advantage of the surrounding environment is becoming the key content of healthy building design. Carbon dioxide is very harmful to the environment and human body and it is always widely known. Vegetation can effectively absorb a large amount of carbon dioxide in the air, and also has the function of purifying the air. Making the residential building is organically merged with the surrounding environment, it can reduce the air pollution and provide a comfortable living environment for the occupants. When designing healthy buildings in housing estates, designers should not only take advantage of the

natural advantages of the surrounding environment, but also strengthen the greening design of residential areas, increase the planting of green vegetation and appropriately expand the planting area of residential areas. By planting flowers and trees, and making a small park in the residential area, which can not only purify the air, but also cultivate people's mood and create a fresh and comfortable living environment for the occupants. In recent years, high-rise buildings have become the mainstream development trend, which can not only save a lot of land resources, but also to satisfy people's living demand. Based on this, designers can consider planting some climbing plants outside the walls of high-rise buildings, this can play a very good decorative role in the appearance of the building. And also to expand the greening area and improve the ecological environment in residential areas. In hot summer, these climbing green plants can absorb sunlight and adjust interior temperature, in this manner shortening the using time of air conditioners and achieving the purpose of saving energy and reducing consumption.

4.5 Natural Ventilation Health Design

Natural ventilation has the function of adjusting the interior temperature and humidity of buildings. However, the application of air conditioning will consume a lot of energy, and at the same time, it will cause different degrees of pollution to the air. Natural ventilation can replace a part of the application of air conditioning, it can provide natural air for residents, and at the same time, achieve the purpose of saving energy, reducing consumption and reducing pollution, and fully protect the physical and mental health of residents.

Many elements should be considered when applying natural ventilation technology in the design of healthy buildings in housing estates, including local natural climate, dominant wind direction, topography and vegetation, in order to achieve the purpose of natural ventilation. At present, the direction of residential buildings in China is between north-south direction and deviate from the west 15°. Making scientific design to the lay out of apartment, strengthening indoor natural convection, and using wind to take away unnecessary indoor heat. It is conducive to improving indoor and outdoor air mobility and interchangeability, thus achieving the effect of controlling indoor temperature and reducing energy consumption. Taking the north housing estates design as an example. At first, designers need to exactly analyze the local climate conditions and use the environmental protection design concept to find a method between architectural design and architectural technical measures. There are four elements of climate characteristics of the north residential buildings: In spring, the area is windy but with less rainfall; in summer, the climate is very hot, but the rainfall is get more; in autumn, the weather is getting cool and the temperature is very comfortable; in winter, the weather becomes cold with less snowfall and the air is very dry. According to the climate characteristics of this

area, we can know that heat preservation and windproof are the key contents in the design, and designers can make use of the windy climate characteristics of this area to design indoor natural ventilation. In the further implementation, the designer can use CFD software to simulate and analyze the average wind direction in summer of this area, so as to clarify the condition of interior natural ventilation, and then make simulation settings according to the actual situation. The simulation results show that the indoor air average is generally below 900s, that shows that, the indoor air is ventilated once every 4 hours, the air can be kept perfectly fresh, which can be good for people's breathing and health. Reasonable layout of residential building and adjustment of indoor temperature by natural ventilation will achieve the purpose of cooling the temperature in summer. It can be seen that indoor natural ventilation can effectively improve the comfort of occupants, which is beneficial to their physical and mental health. In hot summer, the use of natural ventilation can effectively reduce the use of air conditioners, so as to achieve the purpose of saving energy and reducing consumption and get a effective control.

4.6 Rational and Efficient Use of Energy

Rational and efficient use of energy is the core of projects in residential buildings. Designers should implement the policy of saving energy perfectly. Energy saving in healthy building design mainly includes three parts: reducing building energy consumption, increasing energy utilization efficiency and effectively utilizing renewable resources. Therefore, the staff should optimize and improve the building structure and correlative building equipment of residential buildings. On the basis of overall building energy saving. There are many elements, such as day lighting, sunshine, air conditioning system and heating system are specifically considered in the design of residential buildings plan. And do some reasonable plan. After these reasonable designs, high efficiency and energy saving can be realized^[7].

IV. CONCLUSION

With the fast development of Chinese economy, the resident's pursuit of quality of life is constantly improving, and people pay more and more attention to the healthy design of residential buildings. Based on the analysis of the contents of healthy building design in housing estates, this paper focuses on the analysis of healthy building design indicators in residential buildings, which mainly include sustainable development indicators, green indicators and living environment indicators. Designers should actively use the concept of healthy building design to strengthen the rational design of architectural space in the future, and make use of the green technology of healthy houses to realize the scientific planning of healthy houses, so as to truly achieve the healthy sustainable development of residential buildings and satisfy the people's pursuit of improving the quality of life and culture.

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