
Research on New Methods of Modern Residential Building Design

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Abstract

Residential buildings are the product of human response to climate, and its production and development are related to climate. Nowadays, people pay more attention to the energy saving technology and residential comfort of residential buildings. In the design process of modern residential buildings, new technologies, new materials and new technologies are added to the traditional design to build a new energy-saving building for the transformation of climate resources into living energy. In this paper, from the direction of the climate adaptability of the current study of new type local-style dwelling houses building, the climate resources into energy of life way of energy saving building, looking for the future design idea, to provide theoretical basis for the actual construction in the future.

Keywords

Residential buildings, energy conservation, design, climate.

1. Introduction

Residential building is a necessary part of human life. It is a culture produced in the pursuit of temperature. Most of the time of human activities is spent in houses, thus creating a living culture. Improvement of living standards with the increase of human demand, for residential housing, humans need a comfortable space, is not a shelter box, do you want to be comfortable effect will consume energy, if can reduce energy consumption, also can have a comfortable life space, will be human needs, the demand of social development. By introducing modern new technology, new technology and new materials into architectural design, new methods of modern residential building design are explored.

In the new method, the transformation of climate resources into energy of life is the most popular theory in architectural design. The international theoretical exploration began in the book design and the climate in the 1960s, and put forward the discussion on the coordination between architectural design and climate. Later, American architect time frame in the design combined with the natural puts forward the effective ways to explore building energy-saving buildings and the method, thus opens the climate resources combined with the design, the building is a new chapter of energy-saving effect, arises at a variety of supporting the development of new technology. China has been related to this research, including high-tech demonstration buildings have been completed and put into use, such as zero carbon pavilion of Shanghai expo park, very good use of climate resources in the design of the building, energy conservation and environmental protection of the living. In view of the abundant climate resources in China, demonstration energy-saving residential buildings have begun to explore the stage, and the development prospect is very good.

2. Energy Conversion Based on Climatic Conditions

The most important requirement in the living environment is the need for temperature. The support point for modern residential building research is that the climate can show the difference of cold and heat. The so-called climate can show the difference in cold and heat, which refers to the

transformation of the cold and heat from the outside to the energy application into the architectural design during the four seasons. With regard to the new type of residential buildings, the ideal design plan at this stage is to achieve energy conversion based on climatic conditions and convert climate resources into energy of life.

2.1 Residential Building Refrigeration Energy-saving Technology

For southern China, the summer indoor cooling is indispensable to life. The cooling tools are mainly fans and air conditioners. Early people choose indoor cooling fan, from the cost and environmental protection advantages, but along with the popularization of air conditioning, southern region residents are more willing to use air conditioning indoor temperature. It is well known that air conditioning USES freon to achieve the effect of refrigeration, and long-term use can cause environmental damage. Scientists have been studying the hope of finding new refrigerants, but instead of finding a better replacement for freon's refrigerant. Therefore, the research direction of cooling is started, and how to achieve indoor cooling with a new method is not adopted.

Today, there are several bold new cooling assumptions in experimental housing, such as cold storage. Underground temperature in winter is generally low, aiming at this phenomenon, but in the winter through deep underground conductivity temperature materials extracted from underground energy storage at low temperature to the accumulation of cold box, when entering the summer gradually open storage cold box, the residential indoor air conditioner, achieve the objectives of the cool summer house. For north China region, can appear some land deep permafrost, these areas can try to use guide into the permafrost temperature materials, the low temperature of permafrost imported into the cold storage device, this device to cool summer time, don't need to close it, the use of land resources, environmentally friendly and energy saving cooling effect. For south China region can try to guide material deep underground, the earth play in the soil temperature in 18 degrees Celsius all year round, and the conductivity temperature material connected to the residential indoor, indoor natural cooling effect by temperature fluctuation cycle.

There are two key points in the implementation process of the above scenarios: first, the design of the storage cooler needs to reach a certain capacity and can save energy for a long time; The second is the choice of the guide temperature material, how to find a kind of the material with the best effect. Grasping these two aspects, will open a new chapter of residential building refrigeration.

2.2 Residential Building Heating and Energy-saving Technology

At present, China's qinling mountains and huaihe river line for central heating line, the northern region heating source from thermal power plants and heating companies, heating period by improving the boiler system energy saving technology and methods for reducing pollution, to solve the problem of hydraulic misadjustment uneven and at the same time, reduce unnecessary waste. All of these conditions can save about 10% of energy efficiency. However, in the long run, the pursuit of more environmental protection and energy saving is a major trend of social development, and the goal of energy conservation only through this method is far from meeting the future development needs. In recent years, the southern people clamor for the heating is more and more high, local-style dwelling houses building heating energy-saving way also got the attention of the designer, and the use of green resources into the way life energy have attracted the most attention.

China is trying to build some advanced experimental housing, its advanced nature is mainly reflected in the low consumption of heating technology. The heating technology USES the combination of solar energy resources and heat pump technology, which is very good from the viewpoint of energy conservation and environmental protection. During the day and the heat and light are extracted through the use of solar energy resources of heat pump technology transfer heat to the residential underground energy storage tank, the temperature drops in the evening, then released into the building during the storage of thermal energy storage, thus improve the indoor air temperature and increase the living comfort. This method is compared with thermal power plant heating and air conditioning heating, and it is much lower in terms of resource consumption and household living expenses.

Therefore, the design method combining the research of solar energy collection and release technology with local climatic conditions is very promising in the future.

The choice of indoor radiator is also very important. The traditional cast iron made of heat sink is not good enough and the materials are wasted resources. Therefore, in today's residential buildings, this kind of heating mode gradually exits the stage, and is replaced by the use of heating technology. The best use of geothermal technology in China is the traditional north Korean residence, where the "full house kang" form is the same as the current form of earth heating. Generally speaking, heating is the most energy-saving and environmentally friendly way, and the human body will feel comfortable in such an environment. From the perspective of health preservation, the heat is collected in the high space of direct benefit of the human body, which makes people feel comfortable and has the health effect, which is compatible with the health theory of "warm feet and cool head" proposed by Chinese medicine practitioners. The heat dissipation equilibrium of the heating mode is very low and the comfort level is high. In common ground heating technology, carbon crystal ground radiation system has the best effect, and it is introduced into residential buildings. Thermal energy can be better diffused to meet the needs of human living environment for temperature.

2.3 Application of New Materials Technology in Residential Buildings

For modern residential buildings, the concept of "energy conversion based on climatic conditions" must have three elements. The first is the application of climate, the second is the use of energy storage tank, and again is the selection of the temperature guide material. It is the combination of "application, utilization and selection" that can bring this idea to the extreme.

On the design of the new energy-saving building, designers hope can absorb the natural temperature, the temperature into the storage box, again through the energy storage tank automatically adjust the release temperature, cold hot a comfortable environment. To realize this design concept, it is important to select the materials in the storage tank. Current research and development of energy storage material type are many, more suitable for use to is "phase change materials in energy storage box, the process of phase transition can be absorbed or released a lot of heat, and no other material. After the 21st century, China overcame the key technology and began to introduce phase change materials into architectural design to achieve energy saving. In the northern heating, for example, 100 square meters of housing for the measuring unit calculation, the use of phase change heat the floor, after a heating quarter only about 10 KWH electricity consumption, greatly reduce the energy consumed for heating. If the phase-change material is put into the storage tank of a new type of building, the indoor cooling and heating will be carried out through the phase change technology, replacing the traditional air conditioning and heating, which will save more than 60% of the energy.

3. Application of Technology and Construction Technology

Modern residential buildings are designed to conform to the simplest methods, the simplest techniques and the cheapest materials to build the most environmentally friendly and energy-efficient houses. Excellent architectural design is can take its essence from a specific environment conditions to take advantage of, such as climate, light and temperature, and how to extract the essence, will be the new aspects of technology and construction technology.

The first requirement for living environment is the need for temperature, which can only be considered comfortable if the temperature fluctuates in a small range. Nowadays, new technologies and technologies include the research and development of thermal insulation wall, which can prevent the direct solar radiation roof and reduce the indoor thermal load. Sound insulation and ventilation window of research and development, through placed in sound insulation sandwich ventilation channel, realize don't open the window for ventilation and keep a good sound insulation effect, its research and development design popular with residents living in a noisy area. In addition, it also includes a window that can be used to generate electricity and light, which can not only collect solar energy but also penetrate into the sunlight. The new technology can effectively protect the indoor temperature outflow and meet people's demand for temperature.

4. The Application of Intelligent Building

It is the trend of The Times to integrate intelligent building content into the design of modern residential buildings. The so-called building intelligence refers to the harmonious unification of people, buildings and environment through the comprehensive application of intelligent information. Therefore, the purpose of building intelligentized buildings into actual buildings is to achieve the properties of low consumption and high effect.

Nowadays, intelligent residential buildings generally includes five aspects, first, use technical means to transform the climate resource of energy for the life, such as the "poetry lang international block" in suzhou example room, case principle of heat conduction through the heat pump technology, use DNA, the floor of the underground water cycle, building internal temperature throughout the year.

Second, in the application of intelligent technology to the residential housing, such as the "sun star city" changsha project, through the collection of solar energy resources and energy transformation life, the method of power for the community of about 4.7 million degrees every year.

Third, design scientific architectural structure, to build energy - saving, provincial materials, strong buildings. Such as changchun new experimental local-style dwelling houses building, building structure for the triangular shape, based on the research of the roof Angle, create energy saving, thermal insulation, air natural circulation and strengthened, material saving, beautiful effect. In addition, the design method of 45 degrees in the north wall of the building in the "zero carbon pavilion" project of Shanghai world expo will reduce the heating load by 20 percent in the winter.

Fourth, choose efficient and green materials to cooperate with intelligent systems, such as "zero-carbon pavilion" external wall material, with power plant fly ash as raw material, thermal insulation performance is very good. The floor is made of active ecological paint that absorbs carbon dioxide from the air.

Fifth, intelligence is reflected in a residential building in, such as Germany single mothers apartment projects, projects for rainwater and wastewater recycling key design, through the reference of intelligent equipment, makes the construction of water-saving effect is very remarkable, greatly reduce spending on water and waste water.

5. Conclusion

From the Angle of climate adaptability, this paper explores the new method of modern residential building design, discusses the viewpoint from the theoretical point of view, and demonstrates the feasibility from the case perspective. Through the research on the new model residential buildings, the paper finds out the way of building energy conservation building. The construction of this research will open a new chapter of modern residential buildings.

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