

Brief Analysis of Building Energy Conservation and Green Building Application Technology

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Abstract

Green building has become the general trend of sustainable development of global architecture in the 21st century. China is in a critical period of promoting urbanization. Green buildings can solve the resource consumption and environmental problems caused by high-speed urbanization. Therefore, the scale and regionalization of green buildings become inevitable. In order to make green building technology more applicable to urban construction, the key issue is to study the characteristics of green building technology and how to select and evaluate appropriate green building technology.

Keywords

Building Energy Efficiency ,Green Building,Applied Technology.

1. Introduction

Relevant studies show that every 1% increase in urbanization rate will add about 1,000 square kilometers of construction land and about 600 million tons of steel, cement, bricks and other building materials. Urbanization has produced tremendous consumption and destruction of resources, energy and ecology, which threatens the national energy security and the sustainability of the ecological environment. Green building is a kind of building which is harmless to the environment, can make full use of the natural resources of the environment, and can be constructed without destroying the basic ecological balance of the environment. This paper tries to discuss and analyze the application of energy-saving technology in green building, in order to provide some useful ideas for the application of energy-saving technology in green building.

2. What is Green Architecture

The concept of green building mainly includes the following points: (1) energy saving, which mainly emphasizes that we should reduce all kinds of waste of resources; (2) environmental protection, which mainly emphasizes reducing environmental pollution and reducing the amount of carbon dioxide emissions; (3) meeting the requirements of people's use, providing space for people to be "applicable" and "healthy". "Efficient". Every link of green building from design, construction, use, maintenance to demolition has a variety of energy saving and environmental protection requirements. This means that in the design stage, we should focus on the use of environmental factors, and minimize the adverse impact of the construction process on the environment, and ensure that the building can provide people with low-cost, comfortable and healthy space in the operation stage, and make every effort to reduce the degree of damage to the environment caused by demolition.

Application of Energy-saving Technology in Green Buildings

(1) Reasonable building layout can greatly reduce energy consumption in the process of building use. After the scale, function and area of a building are determined, the shape and orientation of the building will have a significant impact on building energy consumption. Because of the different uses of ordinary residential buildings and large-scale public buildings, their calorific factors are also different. From the point of view of energy saving, the design requirements of their shape coefficients are opposite.

(2) External wall insulation of buildings can greatly reduce energy consumption in the process of building use.

External wall insulation of buildings is a green energy-saving project which can greatly improve thermal performance. By laying the thermal insulation layer on the exterior wall of the building, not only the thermal insulation performance in summer is improved, but also the thermal insulation performance in winter is strengthened. This reduces the heating pressure in winter and the cooling power load in summer, thus reducing the energy consumption of buildings. Therefore, from the point of view of reducing energy consumption, we should vigorously promote the implementation of building exterior wall insulation technology.

(3) Systematic control of indoor environment in order to achieve the purpose of energy saving of comprehensive system

One of the main characteristics of green building is to use air treatment, use natural light as much as possible, optimize and improve natural ventilation design and many other integrated systems, optimize and integrate the system in a holistic and multi-directional way. Integrate and optimize the use of various functions organically, and scientifically and systematically reduce the energy consumption of buildings as a whole.

(4) Make full use of clean and abundant natural solar energy

At present, solar energy is the most important energy in the green energy that has been developed. It is an inexhaustible, widely existing natural energy. It has many obvious advantages, such as extremely clean and cheap. At present, the biggest factor restricting the utilization of solar energy is its low energy conversion rate, but from the perspective of development, with the progress of science and technology, the scope of solar energy utilization will be wider and the efficiency of energy conversion will be higher.

3. Technical Route and Material Improvement

(1) Design method

The importance of building energy-saving design is an important link in the overall building energy-saving, which is conducive to eliminating energy consumption from the source. The overall and external environment design of the building is based on the analysis of the climate and environment conditions around the building. Through site selection, planning, external environment and body orientation design, the building can obtain a good external microclimate environment and achieve the purpose of energy saving.

(2) Reasonable Location

Building site selection is mainly based on the local climate, soil quality, water quality, topography and surrounding environmental conditions and other factors to determine the comprehensive situation. In architectural design, it is necessary to maintain a suitable microclimate environment in the whole life cycle of the building, to create conditions for building energy saving, and at the same time not to destroy the balance of the overall ecological environment.

(3) Reasonable Design of External Environment

After the location of the building is determined, its microclimate characteristics should be studied. According to the requirement of building function, we should improve the existing microclimate environment and create a favorable environment for building energy saving through rational external environment design. The main methods are: (1) Arrangement of trees and vegetation around the building can effectively shield wind and sand, purify air, shade the sun and reduce noise; (2) Creation of artificial natural environment, such as setting water surface near the building, utilizing water. To balance environmental temperature, wind and sand, and collect rainwater.

(4) Reasonable planning and shape design

Reasonable architectural planning and shape design can effectively adapt to the harsh microclimate environment, which includes the determination of the overall volume of the building, the shape and composition of the building, the sunshine and orientation of the building.

(5)Energy-saving design of roof

Roof is an important part of building's contact with outdoor atmosphere, the main energy-saving measures are: (1) adopting sloping roof; (2) strengthening roof insulation measures; (3) setting thermal insulation roof according to need.

(6)Energy-saving design of floor

The hollow space of the structure is used, and the shape of the floor ceiling is designed.If the circulating water pipes are arranged in them, the indoor temperature can be lowered by cold water circulation in summer and heated by hot water circulation in winter.

(7)Energy-saving Design of Building Peripheral Wall

The energy-saving design of the wall should not only adapt to the climate conditions, but also improve the special structure of the microclimate environment, such as the sandwich wall design in cold areas, the design of various heat storage walls (such as water walls) in passive solar houses, and the design of vents in the wall in Baghdad to adapt to the local dry and hot climate conditions.

(8)Energy-saving design of building doors and windows

According to statistics, 40% of the energy consumption of existing high energy-consuming buildings in China is lost through doors and windows.Therefore, it is very important to solve the problem of energy saving of doors and windows.

Reference

4. Conclusion

The application of green building concept in the construction industry has epoch-making significance. It can reduce the waste of resources, improve the utilization rate of resources, and also reduce the destruction of human activities to nature, which is conducive to improving people's quality of life and promoting the harmonious coexistence between man and nature.

References

- [1] Wudajiang. Application Technology of Building Energy Conservation and Green Building Demonstration Zone in Jiangsu Province [J]. Building Technology, 2014, 45 (12): 1105-1107.
- [2] Chang Jiangong. Applied Research on Building Energy Conservation and Green Building Technology [J]. Sichuan Cement, 2018.
- [3] Wang Jiulong. Brief discussion on the application of building energy conservation and green building technology [J]. Urban construction theory research (electronic version), 2017 (30): 48.
- [4] Gong Pingping. Brief discussion on the application of building energy saving and green building technology [J]. Jiangxi Building Materials, 2017 (3): 51-51.
- [5] Department of Building Energy Conservation and Technology, Ministry of Housing and Urban-Rural Construction. Demonstration Project of Green Building and Low Energy Consumption Building: Technological Innovation and Practice of Public Building [M]. China Construction Industry Press, 2013.
- [6] Zhang Gaofeng. Analysis of the application status of energy-saving technology in green public buildings in Zhejiang Province --- Taking a three-star science and Technology Museum project of a green building as an example [D]. 2015.
- [7] Chen Yuchang. Development of Green Building and Application of Building Energy Saving Technology [J]. Architecture and Decoration, 2019 (2).
- [8] Energy-saving benefits of green buildings in hot summer and cold winter areas [J]. Civil and environmental engineering, 2018.

- [9] Shanghai Building Energy Conservation and Green Building Technological Innovation Service Platform: Promoting the Healthy Development of Industry by "Standardization" and "Demonstration"[J].East China Science and Technology, 2011 (11): 28-28.