Research on Application of Green and Low-carbon Building Technology

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Abstract: The application of green low-carbon building technology in the construction industry has gradually been promoted. The construction industry, as an energy-intensive and consumable industry, can reduce the energy and resource consumption of the industry with the combination of green and low-carbon building technology. This also indicates that the future construction industry will realize the development of low-carbon buildings and achieve sustainable development of the construction industry.

1. Concept and Significance of Green Low-Carbon Buildings
Green and low-carbon buildings represent the combination of green environmental protection, ecological protection, low-carbon energy saving, construction industry and low-carbon technology. This has improved the green, environmental protection, energy saving properties and value of the building. In the sense of green low-carbon buildings, it is mainly reflected in the following points.

1.1 Save Energy Loss
The construction industry is one of the industries that consumes a lot of energy. In the various stages of building materials, construction, and construction use, various energy sources are used, and energy consumption is large. In the current context of urbanization construction, the development scale of the construction industry is expanding, at the same time, the construction projects are increasing, and energy consumption is also increasing. Construction projects and projects focusing on green and low-carbon buildings also help to save energy and reduce energy consumption. This not only reduces the damage to the natural ecological environment, but also improves the energy-saving properties of buildings. In green and low-carbon buildings, the replacement of traditional building materials with new energy-saving materials has greatly improved the energy-saving properties of buildings and also promoted the sustainable development of the construction industry.

1.2 Protect the Environment
At a time when the ecological environment is getting worse, people pay more attention to the protection of the ecological environment. In ecological environment protection, reducing energy loss and reducing energy emissions are important tasks. The energy consumption in the construction industry is large. In order to reduce energy emissions from the source, it plays an ecological and
environmental protection role. We need to form a green and low-carbon building concept, and combine the low-carbon technology and green building concept to form a new model of building design and construction [1]. For example, in the design of the roof, the concept of green design is used to increase the green area of the roof. This will not only help to form an ecological compensation mechanism, but also improve the overall greening properties and value of the building to better play the role of ecological protection. Furthermore, in green and low-carbon buildings, the application of solar light panels can reduce the output and loss of electrical and thermal energy, make full use of renewable resources and clean energy, and play an ecological and environmental protection effect. It can be said that green and low-carbon buildings have good ecological and environmental protection value and high ecological and environmental benefits, and need to be paid more attention to be promoted and constructed.

1.3 Application of Green Low-carbon Building Technology

Green low-carbon building technology should be combined with the actual environment of the building, and play a role in the physical environment. From site selection to material selection to construction, comprehensive technical application measures should be formed. As an organic combination of the natural environment, green buildings should not be limited to building construction with the help of low-carbon technologies, but should be attached to the building's energy conservation and environmental protection attributes. In actual construction, attention should be paid to whether the green low-carbon building technology can be combined with the natural environment, and whether the low-carbon energy-saving value of the building can be realized in terms of building shape and structure. For one thing, the physical environment needs to be brought into play. Design the building according to the physical factors around the building. For example, in the building elements such as ventilation and daylighting, use the design of the patio to increase the ventilation, and use the building orientation to improve the lighting efficiency. Therefore, the building has more comfortable light, and better create a comfortable living environment [2]. For another, proper site selection is required. In the site selection of the building, the geographical environment, temperature, humidity, wind direction, and groundwater environment should be combined to reduce the damage to the natural ecological environment by the building, and the natural ecological environment should be used reasonably to meet the needs of green buildings. In the construction site selection, it is even more necessary to reduce the damage to the surrounding environment, so that the building and the surrounding environment can coexist in harmony, which not only exerts the ecological benefits of the green building, but also improves the ecological value of the building.

The application of green low-carbon building technology in building construction can reduce the energy consumption rate. This is because green and low-carbon building technology can control the raw materials and reduce the use of traditional building materials. Take advantage of green and low-carbon building technology with the application of environmentally friendly building materials. For example, the thermal insulation materials currently used in green buildings can reduce the impact of outdoor environmental temperature on indoor temperature, reduce the energy loss of indoor thermal insulation equipment, thereby saving energy and reducing energy consumption [3]. Second, green low-carbon building technology can reduce the use of electricity. China has a large amount of power energy, the power resources are in an important position in China, and the use of electrical energy in buildings is inevitable. However, as thermal power generation is still the main mode of power generation, the environmental pollution caused by this mode is severe, and the amount of ecological resources is large. Therefore, it is also necessary to reduce the use of electrical energy with low-carbon technology in the construction of green and low-carbon buildings. In green low-carbon building technology, the use of electrical energy can rely on solar power, wind power, hydropower, etc. After the building is put into use, it can still maintain the solar power generation mode, reduce the loss of electrical energy throughout the building's life cycle, and play a natural ecological environment Protective effect [4]. Finally, green low-carbon building technology can save water resources. The economical use of water resources not only provides an important foundation for ecological
environmental protection, but also contributes a good force for the future use of human resources. In construction projects, there is a practical basis for reducing the use of water resources in building construction with green and low-carbon building technology. In traditional building construction, during the construction phase and the building put into use phase, the amount of water resources used is large, and the amount of construction wastewater is large, resulting in a waste of water resources. The application of green low-carbon building technology in construction projects can be the treatment and recycling of construction wastewater, which satisfies the current low-carbon concept. At the same time, we can build a building ecosystem in the construction industry, improve the recycling efficiency of construction water, improve the protection of water resources, and give full play to the practical value of green and low-carbon building technology [5].

2. Case Study of Green Low-Carbon Building Technology

Take a construction project in Shenzhen as an example for analysis. The building covers an area of 520,300 m², with a total building area of about 547,000 m². There are about 4,000 units in the building. The project includes high-rise houses and low-rise houses with adequate infrastructure. The project was put into construction in 2015. The project was developed with a green building project throughout the entire construction process, and was awarded the three-star green building design logo. The main ecological manifestations of the project plan include: respecting the original terrain of the area, retaining the original natural resources such as forests, artificial wetlands, and other natural ecological environments. It needs to have regional climate characteristics, designing outdoor activities such as balconies with southern climate characteristics, and maintaining building ecology comfort. The building is well-coordinated with the surrounding environment, and can blend well with the surrounding natural environment.

2.1 Technical Analysis of Green and Low-Carbon Buildings

In this building project, the basic system of green and low-carbon building technology has improved the energy conservation and environmental protection value of the building in terms of outdoor environment, building energy loss, water resource utilization, and building material resource utilization.

Based on the analysis of the application of green and low-carbon building technology in water resources utilization, the building project planned and designed water resource utilization modes based on the number of residential units, the number of resident populations, green areas, and water features. Figure 1 below is a plot of water supply and drainage design and water consumption data for the community. In terms of water-saving technologies, the measures of water resource recycling are adopted to form the recovery, treatment and reuse of water resources by biological methods. For example, through the landscape flower house biological treatment of sewage technology, the landscape flower house is combined with sewage treatment. After the sewage flows through the landscape flower house, the biological water treatment system composed of green plants is treated, and the effluent water quality meets the landscape environment water standard for landscape water Replenishment can not only save water for green irrigation, but also be used for road spraying. According to statistics, this water-saving technology saves about 72,000 tons of water resources each year, which has achieved the purpose of green and low-carbon building technology.
In building heating design, green low-carbon building technology is used to improve the building heating function and reduce the use of heating equipment and energy loss. It has also become the main technical application point. The building project uses a low-temperature radiant heating and cooling system, uniformly distributing water pipes in the building ceiling, and low-temperature hot water as the medium. It is designed on the water supply temperature and the return water temperature, and the water temperature is adjusted according to seasonal needs. Generally, the indoor temperature is automatically adjusted through a radiation method with a temperature difference of 2 ° C to form a heating and cooling system. In this technology mode, the cooling and heating efficiency in the building is higher than air convection heat transfer, which keeps the temperature in the building at a comfortable temperature for a long time, which greatly reduces the application of heating equipment such as air conditioners, and also saves energy and reduce energy consumption. The heating energy consumption of the total construction area of 547,000 m² of this construction project was tested. The average heating energy consumption was 14.12Kwh / (m².a), which was lower than the current average heating energy consumption in Shenzhen. Table 1 below is the energy consumption analysis table for this construction project.

| Energy Project | Project Average Energy Consumption | Shenzhen Average Energy Consumption |
|---------------|-----------------------------------|-----------------------------------|
| Heating       | 14.12Kwh/ (m².a)                  | 27 Kwh/ (m².a)                    |
| Gas           | 5.08 Kwh/ (m².a)                  | 9 Kwh/ (m².a)                     |
| Electrical Appliances | 5.92 Kwh/ (m².a) | 3 Kwh/ (m².a) |
| Sum           | 25.12 Kwh/ (m².a)                 | 39 Kwh/ (m².a)                    |

2.2 Thoughts on the Application of Green Low-Carbon Building Technology
The application of green low-carbon building technology in construction engineering and construction projects is advanced. It has improved a variety of deficiencies in construction engineering, reduced energy loss, and saved a lot of resources and costs. We apply low-carbon technology to construction projects, which not only reduces the energy consumption rate of buildings, but also increases the value of energy conservation and emission reduction of buildings. In terms of the advantages of low-carbon technology, water saving and thermal insulation, both greatly increase the inherent value of the building, make good use of the building's energy saving and environmental protection properties, and have the advantage of building ecological value.

3. Conclusion
Green low-carbon buildings are the main link that maintains the relationship between people, buildings and nature. In the application of green low-carbon building technology, we should focus on reducing building energy consumption and building resource utilization, so as to reduce the impact of buildings on the environment, increase the value of green building energy conservation, and promote the balance between the natural ecological environment and building economic benefits. Green low-carbon buildings are an effective way to meet the needs of social development. Combining
low-carbon technologies in technical applications to achieve energy-saving and emission-reduction effects, they constitute a good building ecological attribute and ecology in the construction and construction of construction projects advantage. At present, in the construction industry, the application of green low-carbon building technology has become more common, and a more standardized and unified construction design has been formed, which has laid a good foundation for the application of green low-carbon building technology and is more conducive to the application of technology.

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