Application of green energy saving technology in construction engineering

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Abstract: This paper introduces the basic concept of green energy-saving technology in architectural design. The necessity of applying green energy-saving technology in building engineering construction is also described. The application of green energy-saving technology in roof doors and windows, wall insulation, circulating water pump heating, clean energy and heat pump application are presented. All these works broadens the way forward of building construction and lays a good foundation for the development of construction industry.

1. Introduction
With the progress of science and technology and the development of society, Chinese economic level is also increasing. People's concern for the construction industry has gradually shifted from the guarantee of quality and comfort to the performance of energy conservation and environmental protection of construction projects. Therefore, gradually introducing the concept of green energy conservation in the construction process can effectively reduce energy consumption and capital waste, which is beneficial to the construction industry sustainable development.

2. The significance of applying green technology
2.1 Efficient application of energy saving technology
In the process of green building design, scientific application of green energy and energy-saving technology can ensure the more efficient application of various materials and building energy-saving methods to meet the needs of building energy conservation. Relevant personnel can reasonably apply the functions of energy recycling, heat insulation, moisture preservation, heat preservation and ventilation in architectural design.

When building energy-saving planning, construction personnel need to scientifically apply energy-saving technology and green resources to realize the sustainable application of relevant resources[1]. When carrying out specific energy-saving planning, construction personnel also need to develop and utilize wind energy, solar energy and other clean energy. On this basis, it can not only effectively control the environmental pollution, but also further reduce the cost of construction enterprises.

2.2 Water conservation
In the process of green building technology application, the green water-saving method is usually used. Through the use of water quality monitoring system and rainwater purification device, water resources are recycled and effectively saved. In the green irrigation, the relevant staff can use sprinkler irrigation
equipment and micro irrigation equipment to spray in the green area, scientific application and water purification device to recycle steam and rain water. The scientific application of green building technology can effectively recycle the resources and ensure the cost saving. In the process of specific project construction, the staffs also needs to apply modern network equipment to comprehensively control the water-saving system, so as to ensure the efficient operation of the water-saving system and achieve a higher degree of sustainability.

2.3 Optimize internal planning
In the process of architectural design, designers need to deeply analyse the overall structure, effectively combine the specific requirements of green building technology on land saving planning and design and indoor and outdoor environment design, and carry out reasonable planning of indoor building structure. In order to ensure the effective matching of relevant pipelines and ensure the overall pattern of indoor lighting and building, it is also necessary to use this technology for outdoor. The environment should be reasonably planned. Through the reasonable application of indoor and outdoor environment and land-saving planning technology, it can ensure that the building layout can better meet the planning requirements and further realize the warm winter and cool summer.

3. Application of green building technology

3.1 Design of Early optimistic stage
In the stage of architectural design and planning, designers need to deeply analyse the climatic environment and geographical conditions of the construction site, effectively combine computer technology and green building technology, simulate the climate and space of living environment, and optimize the building orientation and space design to avoid waste of related resources. At the same time, they also need to use computer simulation design drawings, to ensure that the construction personnel have a more intuitive feeling. On its construction the scientific improvement of the construction plan can effectively reduce the difficulty of its adjustment, so as to ensure that the waste of resources can be effectively avoided after the adjustment.

In the early stage of architectural design, by using computer technology to optimize the design scheme reasonably, the specific problems existing in the design process are timely adjusted. Through the use of computer technology to simulate the construction, the specific situation of the shadow distribution of the building is reasonably optimized to ensure the sunshine duration of the building. At the same time, the reasonable optimization of the interior structure design is also needed to ensure that the building has higher practicability and integrity. At the same time, it is also necessary to analyse the specific situation of the construction site. In the specific application of green building technology in architectural design, designers need to deeply investigate the climate conditions of the building site, design the building based on the differences of sunshine direction and sunshine time in different regions, and scientifically adjust the architectural design scheme based on the local climate, temperature and other conditions. In the process of green building construction, climate and environment are the key issues in the design work. The temperature change and natural environment will restrict the cost investment of architectural design to a certain extent. The outdoor environment and indoor structure are the problems that must be faced for a long time in the specific design process of the construction industry.

3.2 Improvement of enclosure design
In the process of engineering construction, through the scientific comparison of self-insulation, internal thermal insulation and external thermal insulation, ceramsite concrete is used for construction. In the construction process, the thermal bridge problems of column and beam are effectively handled, and the external wall surface can be adjusted to ensure a broader contact surface between the building surface and the outdoor air. It can further realize the effect of heat insulation and heat preservation[2]. At the same time with ventilation noise reducer and photovoltaic, the effective combination of glass
and scientific application of color changing glass can actively adjust the absorption and transmission characteristics of glass, and make scientific selection of light intensity. At the same time, it has a certain degree of reflective absorption or reflection of external radiation, which can effectively avoid heat diffusion in the indoor environment.

3.3 Combining green building technology with traditional design

In the process of architectural design, there is a great difference between traditional analysis method and green building design. Green building technology needs to implement quantitative analysis based on traditional experience cognition. On this basis, it can lay a solid foundation for the further development of building technology. Generally, this method specifically refers to the use of computer simulation. In depth analysis and statistics of energy consumption in the construction process, the specific problems in the construction will be clear and carry out scientific improvement, realize the reasonable optimization of green building technology[3].

In the specific design of the building scheme, the architectural designers combine the green building technology and traditional design technology effectively. Scientifically apply quantitative analysis to optimize the architectural design basis, and on this basis, they can conduct in-depth analysis and comprehensive integration of their building data, and find out the basic problems in the process of architectural design. Reasonable optimization of its related technology ensures that the construction technology to achieve a higher degree of intelligence. In the process of building energy-saving design, through quantitative analysis technology, it can real-time monitor the energy consumption, effectively improve the level of green buildings, and guarantee the refinement of energy-saving effect to ensure that green buildings can further meet the construction requirements of low pollution and low energy consumption. At the same time, it also needs to effectively integrate the traditional architectural form and green building technology, and optimize it reasonably, so as to ensure the sustainability of its resource utilization.

4. Engineering energy saving design

4.1 Energy saving technology of roof doors and windows

The roof is an important part of the construction engineering. Because of the long-term influence of natural factors and the large area of sunlight radiation, it is not easy to adjust the temperature in the house. Its essence is to change the area and absorption rate of sunlight, reduce the impact of external environment temperature on the house, reduce the energy consumption in the house, so as to achieve the goal of green environmental protection. For example, by changing the shape of the roof to reduce radiation, the temperature in the house can be effectively adjusted, such as round, pointed, etc. In order to ensure its environmental protection characteristics, new materials with small thermal conductivity can be selected. On this basis, corresponding composite materials can be added on the insulation layer and moisture-proof layer to ensure the indoor comfort, as shown in Figure 1.

![Figure 1: Energy saving windows](image-url)

The main function of doors and windows is to keep the indoor air in good condition for a long time. Due to the traditional application technology does not fully understand the characteristics of the door and window performance, resulting in serious consumption of resources. In the process of building construction, it is necessary to effectively select the materials of doors and windows according to the
actual situation, and carefully consider the factors such as the function of the building and the direction of doors and windows.

4.2 Wall thermal insulation technology

Wall thermal insulation technology refers to the construction of wall insulation system by adding a layer of protective film on the inside or outside of the wall, so as to increase the insulation effect in the building. In the specific construction process, it is necessary to design the insulation layer on the inside or outside according to the actual situation. If it is added to the inner side, it will be relatively easy in technology and construction, and at the same time, it can reduce the cost, but the insulation effect is not obvious. If it is added to the outside, it can effectively reduce the use of resources, and can also avoid the generation of thermal bridges, which has a strong insulation effect, thus reducing the heat. However, there are more strict requirements for the construction technology, which may lead to water leakage, cracking and other phenomena in the later stage, resulting in many quality problems and affecting the insulation effect of the wall[4]. Therefore, we must strictly control the quality of thermal insulation materials, and constantly optimize the design of thermal insulation technology of walls, so as to improve the use efficiency of resources and further realize energy conservation and environmental protection, as show in Figure 2.

![Figure 2: Structure of thermal insulation wall](image)

4.3 Clean energy utilization technology

At present, clean energy is the main application object in all aspects in China. At the same time, the application of new energy can effectively alleviate the energy shortage in China, and has a positive impact on its development. The application of clean energy can effectively control the construction cost and reduce the pollution to the environment. In the process of construction engineering construction, the main clean energy that can be used are solar energy and wind energy, as shown in Figure 3.

![Figure 3: Solar energy utilization](image)

First, solar energy is one of the most rapidly developed and widely used clean energy in China, with renewable performance. Therefore, solar energy resources have broad development space. With the rapid development of science and technology in China, the use of solar energy resources technology has been relatively mature, can be skilled in its transformation and application, increasing the utilization rate of solar energy resources. In the construction project, the solar energy can be converted into electric energy through the solar panel, which plays a certain role in power supply for the building[5].
Second, wind energy is also an important clean energy in China's new energy, with the characteristics of energy conservation and environmental protection, recyclable use and green health. Therefore, in the construction process, it is necessary to strengthen the use of wind energy, reduce the use of other non-renewable resources, and improve the quality and efficiency of the overall construction, so as to play a certain role in the construction of green energy conservation and environmental protection. In the construction process, through the operation of relevant machines, the wind energy is converted into electric energy, and the power supply for construction is realized together with solar energy resource technology. It can reduce the construction cost expenditure to a certain extent, and ensure that the construction project can always maintain stable operation[6].

5. Conclusion
To sum up, the application of green energy-saving technology is the inevitable trend of construction development. It can not only effectively reduce the problems of resource waste, energy consumption and environmental pollution, but also achieve the environmental balance of project construction. Therefore, it is necessary to increase the innovation of energy-saving technology and materials, so as to promote the overall construction project direction on the basis of ensuring the quality of construction projects energy saving and efficient development direction.

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