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Research on the Application of Energy-saving, Green and Environmentally Friendly Building Materials in Engineering

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Abstract

In recent years, China has vigorously promoted the application of the concept of ecological civilization construction in all walks of life. As an important economic pillar in the field of urbanization construction in China, the construction industry must also strictly implement the concept of ecological civilization construction and actively use energy-saving, green and environmentally friendly building materials to ensure the long-term sustainable development of the construction industry. In view of this, in order to further promote the green development of the construction industry and strengthen the application of energy-saving, green and environmentally friendly building materials, the main content of this paper is to analyze and study the specific application of energy-saving, green and environmentally friendly building materials in engineering, and to provide reference and reference for relevant practitioners and researchers.

Keywords

Energy saving, green and environmental protection; building materials; engineering application

With the proposal and implementation of the "dual carbon" strategic goals, people are paying more and more attention to the construction quality of green buildings. How to strengthen the application of energy-saving, green and environmentally friendly building materials in engineering is an important part of promoting the development of green buildings. Therefore, the main content of this article is to analyze the performance characteristics of energy-saving, green and environmentally friendly building materials, and discuss and study the specific application paths of such materials in engineering.

1. Analysis of performance characteristics of energy-saving and environmentally friendly building materials

1.1 Low thermal conductivity

Generally speaking, building materials have low thermal conductivity, and the thermal conductivity of the surrounding walls will also be relatively small, and the wall insulation effect will be better. Compared with traditional building materials, energy-saving and environmentally friendly building materials are new wall materials. The thermal conductivity of such materials is generally low. They can not only play a good role in thermal insulation, but also provide antibacterial, fireproof, moisture-proof, UV shielding, noise pollution isolation and other diversified functions on this basis, improving the application quality of building materials.

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1.2 Less environmental pollution

Energy-saving and environmentally friendly building materials have less toxic ingredients and more stable structures. They can effectively reduce the pollution caused by traditional waste building materials to the environment, and support the secondary recycling and reuse of building materials. They can effectively reduce the demand for energy consumption of building materials, save the purchase and application costs of building materials, and thus implement and promote the development of green buildings.

2. Specific application of energy-saving, green and environmentally friendly building materials in engineering

2.1 External wall insulation

External wall thermal insulation is the most common application of energy-saving green building materials in engineering at this stage. It is mainly divided into two materials: rock wool board and polystyrene foam board. Among them, the production of rock wool board materials is mainly produced by the pendulum method. It is a water-increasing type of thermal insulation building material with good flame retardancy, thermal insulation and energy-saving characteristics. The application method in engineering is gluing and nailing. Usually, a rock wool board with a thickness of 5 cm is selected for external wall insulation. Relevant construction personnel can choose the appropriate rock wool board specifications and types according to the actual construction needs and environment [1]. Polystyrene foam board is divided into molded board and extruded board. This material has low density and water absorption rate and has good sound insulation function, but its application in engineering requires strict control of the specifications of building materials.

2.2 Low-E glass

High-rise buildings are the standard of current urbanization construction. Most corporate buildings are keen to use all-glass building materials for exterior wall decoration. However, this material has excellent reflective properties, which will cause serious optical pollution. Ordinary glass does not have good astigmatism and heat insulation functions. Under strong reflection, it will also affect people's vision health. The low-radiation coated glass made of energy-saving green and environmentally friendly building materials can effectively improve the defects of traditional ordinary glass in engineering. By using metal coating technology on the outer layer of glass to strengthen the heat insulation and astigmatism of glass, and provide the function of isolating ultraviolet rays and radiation, it can give people a more comfortable office and living environment.

2.3 Cement fiber board

Cement fiberboard is also a new type of green, energy-saving and environmentally friendly building material commonly used in construction projects. Its main components are various inorganic substances, which can be fully integrated with different types of fiber materials to ensure the structural stability of the cement fiberboard. It has strong hardness and fire resistance. Compared with traditional ordinary building materials, the comprehensive cost performance of cement fiberboard is very good. It can not only effectively avoid the occurrence of construction errors and other problems, but also provide more rescue conditions for fire rescue when sudden fire accidents occur [2].

3. The significance of the application of energy-saving, green and environmentally friendly building materials in engineering

As people's living standards continue to improve, they are more and more concerned about environmental issues. Energy conservation and green environmental protection are in line with the development concept of modern society. Therefore, in the construction of construction projects, we should focus on the use of green, energy-saving and environmentally friendly materials to achieve rational use of resources.

3.1 Reduce environmental pollution

In the process of engineering construction, a lot of building materials will be used. If these materials cannot be effectively managed and controlled, they will cause great harm to the environment. Therefore, the country attaches great importance to the development and popularization of these materials. While putting forward new requirements for the quality of engineering building materials, it also points out a new development trend for their development.

Building materials must be improved on the basis of their original quality, so as to reduce the harm to humans and the environment, and improve the durability and energy saving of materials. At present, the building materials used in the domestic market have good environmental protection and durability, which greatly reduces the pollution to the environment [3].

3.2 Utilize new technologies and new materials

As people pay more attention to environmental issues, the construction industry is also keeping up with the times and constantly innovating new technologies, and then developing new green and environmentally friendly materials, ensuring that construction materials have a significant improvement in energy saving and environmental protection, which not only meets people's pursuit of aesthetic effects, but also realizes the full utilization of new energy. Now, many non-renewable resources are in short supply, which has a higher demand for the continuous development and use of new energy. Therefore, the engineering construction industry must have breakthrough research and development, only in this way can we better achieve energy conservation and environmental protection, thereby promoting the green development of my country's construction industry more rapidly.

3.3 More diverse functions

In addition to being pollution-free and energy-saving, energy-saving and environmentally friendly building materials also have the advantages of being multi-purpose and consuming less energy. Because most building materials are produced from many kinds of materials through new processes, it is more practical to combine the advantages of various materials. In engineering, the use of green and environmentally friendly building materials can improve the user experience. For example, the application of nanoplates in engineering can clean the environment, improve the quality of the user's living environment, and bring a better experience to users. The application of energy-saving and environmentally friendly materials can make full use of materials for enterprises, thereby reducing costs. For users, it not only reduces energy consumption, but also allows users to have a healthier living environment. For the social environment, it can greatly reduce the pollution of the environment caused by construction waste. The use of green materials in construction projects not only improves the quality of the building, but also optimizes and innovates the production technology, creating more economic benefits for the company. Therefore, the company should actively respond to the country's call for environmental protection. Only in this way can the company gain greater development space.

4. Strategies for the use of energy-saving, green and environmentally friendly building materials in projects

4.1 Selection of material properties according to building requirements

During the construction process of a building project, there are many construction requirements. It is necessary to select appropriate materials based on the design characteristics of the building and the performance of the materials. For example, in thermal insulation, previous buildings used 370 brick walls and 240 brick walls as load-bearing and partitions. The thermal insulation effect of these two materials is not very good. Therefore, when carrying out the thermal insulation system, materials with good flame retardant and thermal insulation effects can be selected. At the same time, thermal insulation cotton is an energy-saving material. It is not only low in smoke and toxicity, but can also reduce pollution to a certain extent and even improve the thermal insulation coefficient. The stability and connectivity of the material are very good. In addition, doors and windows are also the key to building thermal insulation. Heat transfer is usually required through windows and doors. Therefore, in the design of doors and windows, thermal insulation, energy-saving and environmentally friendly materials should be used to improve the quality of the building. In green buildings, there is no need to rely on external forces to add heating or cooling to the room, so the design of windows should be reduced. Sunlight increases the temperature in the room through the windows, and the thermal insulation effect of the building's exterior walls should be enhanced to ensure the heat storage effect inside the building [4].

4.2 Selection according to national energy-saving and environmentally friendly material policies

In order to promote China's economic development and strengthen environmental protection, the state has proposed development and improvement strategies in green buildings, and has also formulated relevant environmental protection standards and issued a notice on the implementation of green buildings. Some energy-saving and environmentally

friendly material exhibitions are also produced under the promotion of the government. For example, at the exhibition of aluminum doors, windows and curtain walls, doors, windows, curtain walls, aluminum materials, hardware accessories, etc. are displayed. These are some products with high performance and little impact on the environment. Therefore, they have also been recognized and supported by the state, and the application of their materials has been promoted from a macro level, and finally good results have been achieved. In addition, China also pays attention to a kind of environmentally friendly material bio-latex paint in terms of energy conservation and environmental protection. Its construction is simple and green. Moreover, this paint is harmless to humans and can prevent the growth of mold in the wall. In the process of popularizing water-based materials, its purpose is to replace solvent-based paints, so as to achieve the purpose of reducing environmental quality. For example, water-based epoxy floor paint has been widely used in China, and its use effect is very good, which has played a certain role in promoting the production of water-based epoxy paint.

4.3 Pay attention to the recycling of green and environmentally friendly materials

Energy-saving and environmentally friendly materials have the characteristics of being recyclable. Due to the relatively large energy consumption of current buildings, there is still a certain degree of overcapacity in the case of scarce resources, and many building materials will be lost. In view of this situation, it is necessary to recycle old materials to improve the utilization rate of materials and reduce the cost of materials. For buildings in the demolition area, the brick and tile materials after demolition also need to be processed to a certain extent and then recycled after processing. Another thing is the treatment of solid waste discharged in industry, such as fly ash. In the process of coal combustion in thermal power plants, fly ash, a waste, will be discharged, and this waste will have a great impact on the external environment. However, since this waste itself has the characteristics of looseness and porosity, if it is combined with energy-saving and environmentally friendly materials, the utilization rate of fly ash can be greatly improved, thereby reducing the pollution rate of the surrounding environment. In the application of building materials, making full use of the reaction of fly ash with calcium hydroxide and alkaline earth metal hydroxides can form high-performance building materials, thereby improving the strength, bearing capacity and durability of building materials. Therefore, adding fly ash to concrete can reduce the amount of concrete and the amount of water used in concrete. Because cement releases a lot of heat when it comes into contact with water, which makes the concrete unstable, adding fly ash to the hydration reaction can improve the permeability of concrete and ensure the stability of concrete. In addition to the above methods, fly ash can also be combined with other wastes to steam fly ash bricks and fly ash silicate blocks. These are new types of thermal insulation bricks. Their characteristics are that they are porous and lightweight. They are mainly composed of fly ash, aluminum powder, lime, etc., and they are combined and mixed. Such building materials have very good overall thermal insulation performance, high fire resistance, and low heat conduction efficiency. They can reduce the use of fuel, reduce costs, and improve ecological benefits [5].

5. Application prospects of energy-saving, green and environmentally friendly building materials in engineering

At present, people are most concerned about environmental issues. Since my country used to focus on promoting economic development, the current environmental problems are very serious. In order to solve this problem, my country has been continuously promoting the concept of green environmental protection in recent years. The construction industry is the first to take the lead and continuously conduct in-depth research on the environmental protection construction industry, looking for green environmental protection materials that can replace traditional building materials, reduce environmental pollution, and reduce energy consumption. New green environmental protection materials provide a new opportunity for current environmental protection issues. Using more green materials will contribute to a beautiful China.

During this period, everyone clearly realized that economic development cannot be achieved by sacrificing the environment alone. The previous resource exploitation has caused great damage to our country's environment. Some ecological resources and environment are no longer recoverable, which makes our environmental pollution problem increasingly serious. In the construction industry, we have begun to vigorously advocate the use of green environmental protection materials for construction. Many construction companies are also undergoing transformation. The application of green environmental protection materials has become more common, and research on them is also constantly deepening. The emergence of green environmental protection materials is also in line with the trend of the times, and has been widely used in the construction industry. However, it has not yet been popularized, so its

development potential is still great. In order to ensure that it can be better applied, we must strengthen publicity and raise environmental awareness. To achieve green environmental protection, we cannot do without everyone's efforts, and we need the entire industry to unite and move towards the direction of green environmental protection [6].

6. Conclusion

To sum up, under the background of comprehensively promoting the development of green buildings, construction companies should vigorously promote the use of energy-saving, green and environmentally friendly building materials in construction projects. They should choose appropriate building materials and specifications according to actual construction needs and environmental conditions, so as to maximize the performance characteristics of energy-saving, green and environmentally friendly building materials.

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