

# Application analysis of green building materials in civil engineering construction

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**Abstract:** with the development of China's economic construction, nowadays, the concept of sustainable development has been deeply rooted in the hearts of the people. People's awareness of environmental protection is also growing. In this context, in order to reduce environmental pollution caused by civil engineering construction, green building materials are widely used in civil engineering. In view of this, this paper analyzes the application of green building materials in civil engineering construction, hoping to provide some valuable references for the majority of construction friends.

**Key words:** green mountain building materials; Civil engineering; construction

## 1. Connotation and classification of green building materials

### 1.1 connotation

Nowadays, in the construction of civil engineering, various environmental protection and green building materials are widely used, and play an important value and role in the construction process. Green environmental protection material is a new environmental protection material with multiple functions, which is developed by a variety of science and technology. This material has important practical value in the actual construction process. Its application can not only improve the utilization efficiency of building energy, but also has strong environmental protection performance, with little impact on the environment, and can also be recycled here. At present, most of the green environmental protection materials convert various construction waste, industrial waste and other wastes into environmental protection, green, recyclable and low impact building materials through science and technology. In addition, scientists have also invented building materials with more significant functions such as environmental protection, sustainable use and energy conservation by using a number of technologies on this basis. When their service life has expired, these materials can be recycled here and can be used again after further processing. Compared with traditional building materials, the use of new building materials, While greatly avoiding environmental pollution, it also saves a lot of building resources and energy resources. It can be seen that green environmental protection materials can not only be recycled, save a lot of resources, reduce environmental damage, but also provide effective protection in building safety, reliability and economy.

### 1.2 Classification of green building materials

Nowadays, through the innovation and research and development of scientists, there are many kinds of green building materials, which can be divided into two categories according to their functions and characteristics. According to the characteristics, it can be divided into: energy saving type, safety type, health type and recyclable type. Among them, the energy-saving type mainly refers to that building materials can be used many times and repeatedly, which can achieve the effect of saving energy and resources; Safety type mainly refers to that the safety factors can be well controlled during the construction of civil engineering; Healthy type mainly refers to that substances harmful to human body, animals and the environment will not be produced during the construction process; The recyclable type mainly refers to that the relevant building materials can be reused in the process of use, and the impact on the environment is very small, and its treatment is also very simple. According to their functions, they can be divided into three types: functional type, structural type and decorative type. The functional type mainly refers to that in the process of optimization, attention should be paid to maintaining the performance of the original materials to avoid wasting materials. Structural type mainly refers to making full use of its own structure in the process of civil engineering construction to avoid material waste or the problem of using wrong materials. Decorative type mainly refers to environmental protection materials that play a role in beautification in the process of building decoration.

## 2. Necessity of application of green building materials in Civil Engineering

### 2.1 Meet people's living needs

Nowadays, with the improvement of the quality of life of our people, more and more people begin to pursue a green, healthy, low-carbon and environmental life, which not only has a new requirement and standard for life, but also has higher requirements for the living environment. At present, people pay more attention to environmental protection, green and health when choosing building materials and living environment. Many civil engineering in the actual construction process, in order to better meet the needs of users, a large number of green building materials are used. Great changes have taken place in the concept of the majority of consumers, and the consumption concept based on green is being formed. Therefore, it can be said that green building materials can better meet the needs of the people.

### 2.2 Meet the needs of national development

There is a close relationship between the construction industry and the national economy, and the economic lifeline of the country is greatly affected by the construction industry. Therefore, in order to better carry out the transformation and structural optimization of the national economy, it is necessary to optimize and adjust the relevant construction industry. The application of green technology in

the construction process has important value and significance for national development and the implementation of the national policy of sustainable development. This can not only save a lot of resources and energy for China, reduce the degree of environmental damage caused by civil engineering to a minimum, but also realize the recycling of China's economic resources, optimize the economic structure, and make it healthy and sustainable development. Therefore, the application of green building materials in civil engineering not only meets the needs of China's current economic transformation, but also can greatly promote the development of the national economy, which is more conducive to the realization of the "two centenary goals" .

### 2.3 Realize the sustainable development of Civil Engineering

In order to better build a sustainable, environment-friendly and resource-saving society, it is necessary to use green building materials scientifically and reasonably. For civil engineering, the use of traditional building materials may not only release a large number of substances harmful to human health and produce a large number of pollutants during the construction process, which will have a serious impact on the human body and the environment, but also cause a large amount of waste of resources and energy, resulting in a large number of construction costs. If green building materials are used in the actual construction process, it can not only save resources and energy, reduce construction costs, but also protect the environment and human body . Therefore, in the process of civil engineering construction, the use of green building materials is not only the symbol of health and safety, but also the embodiment of green and environmental protection, which is conducive to the sustainable development of civil engineering.

## 3. Application and innovation path of green building materials

### 3.1 Exterior wall

In the actual construction process of civil engineering, relevant staff should, under the guidance of the concept of green building design and construction, strive to make the exterior wall of the building green, environmental protection and energy saving, and at the same time ensure that the exterior wall has strong waterproof and thermal insulation properties, in line with the relevant national standards. In the process of exterior wall construction, the staff not only selected the traditional thermal insulation board, but also used aerated concrete blocks, and purchased inorganic lightweight aggregate thermal insulation mortar with high thermal insulation, pollution-free and non-toxic properties. In addition, LBG metal finish is installed on the outside of the thermal insulation board, which can not only make the thermal insulation board of the building exterior wall more in line with the aesthetic concept of the majority of owners, but also better optimize the thermal insulation performance . Aerated concrete material itself has a certain water-saving performance. When it is used in the construction of building exterior wall, it can reduce the water consumption in the concrete construction stage, avoid the waste of water resources, and effectively reduce the overall construction cost of civil engineering. In addition, polyurethane foam is also used in the construction of building exterior walls, which is mainly applied evenly on the inner side of the wall below the building. This green material has enhanced protection function, and can effectively prevent the cracking of building exterior walls due to low temperature, or a large number of friction between building materials and components in the subsequent construction stage. According to the actual investigation, if green building materials are used in the construction phase of the external wall, the indoor temperature is 3-5 degrees higher than that of traditional building materials .

### 3.2 Application of green building materials in external buildings

After years of construction experience, nowadays, the construction industry has reached a consensus on the cognition from external construction to internal decoration. This construction period needs a good time, especially the time required for internal construction and external construction. During the construction of the external main structure, the constructors can fully prevent the damage of some external environmental factors by selecting reasonable green building materials . For example, in the south of China, because of the weather humidity, especially the large amount of precipitation in summer, the high temperature, the humid and sultry air, and the frequent occurrence of acid rain in recent years, the traditional building materials are prone to corrosion. Therefore, in order to improve the corrosion resistance, environmental protection, thermal insulation and other functions of the external wall of the building, the architectural design unit should reasonably select green building materials in the design of the external building. Over the years, after the long-term practice summary of construction workers, in the process of external construction, green building materials are used to improve the corrosion resistance of building exterior walls, so as to improve the service life of buildings and reduce environmental damage to buildings. These green building materials mainly include two categories, one of which is ecological glass building materials . In general, in the process of building construction, glass is installed on the external wall, which increases the difficulty of cleaning and the area of light receiving. Therefore, it can be optimized on the glass to achieve the purpose of energy saving and environmental protection. There are many kinds of common eco glass, such as self-cleaning glass, which has strong hydrophobicity, can use rainwater to take away the dust attached to the glass, and can also decompose the oil stains attached to it. Color changing glass, which can change the light transmittance, so as to adjust the indoor temperature. When the temperature is too high in summer, it can reduce the light transmittance to cool down. When the temperature is low in winter, it can increase the light transmittance to improve the indoor temperature. Another green building material is new concrete , which has been developed through long-term practice in China. By adding some materials to the traditional concrete, it has good performance to meet the needs of different environments. For example, adding some steel needles, fibers, minerals, etc., there are many kinds of common concrete, such as intelligent concrete, which has powerful functions, such as air purification, environmental regulation and green ecology. Fiber reinforced concrete has very strong compressive strength, even stronger than the traditional reinforced concrete, and the cost is relatively low. Color concrete can predict climate change according to its color change, because its color will change relatively with different

air humidity. The function of lightweight concrete is very powerful, with strong cold resistance, and it can be constructed in special areas.

### 3.3 Application in top-level design

Nowadays, green building materials are widely used in all aspects of civil engineering construction, especially in the top-level design. Compared with traditional building materials, green building materials have very strong mechanical properties. Therefore, in order to improve the quality and service life of civil engineering, green materials can be used in the construction process. In the actual construction process, we should first clarify the specific nature of the project and the construction objectives of each construction link, and then scientifically select materials on this basis to ensure that these green building materials will give full play to their effectiveness in the use process. For example, in the design process of high-rise buildings, the selection of top-level civil engineering materials must be scientifically planned and analyzed by using strong architectural knowledge, and the basic needs of urban layout should be taken into account to ensure the full performance of these green building materials. For example, when selecting materials for flat roofs, it is necessary to select some green building materials with good load-bearing and waterproof properties; When the roof is curved, the suspension structure or steel frame concrete can be directly used to construct the integral thin shell.

### 3.4 Interior decoration

In the process of interior decoration of buildings, many factors are considered. It is not only necessary to consider the practicability of building materials, but also to screen the aesthetic degree of materials. In this process, the use of green building materials can make full use of its high-quality performance. In the process of interior decoration, It can not only improve the comfort of living, more in line with the owner's aesthetic concept, reduce the impact of noise to a minimum, but also have powerful functions such as heat and moisture insulation. The main decoration materials at this stage are mainly described in this paper. The first is ecological ceramic building materials, which are mainly used in washbasins, toilets and other places, because traditional ceramic materials will consume a lot of resources in the production process and cause serious pollution, and the use of ecological ceramic building materials can avoid these shortcomings, It not only reduces energy consumption, but also has strong environmental protection performance. The second is ecological wood building materials. In the traditional decoration construction process, concrete materials are widely used. Compared with this, this new type of green building materials has significant advantages. It can give full play to its own material function, but also do a good job in quality control. Its application has greatly promoted the development of civil engineering industry.

## epilogue

In short, in the new era, green building materials are widely used in civil engineering, but due to China's relatively large population base, China's construction industry still has a long way to go. In order to achieve the stable, healthy, safe and sustainable development of China's construction industry, at the national level, we should vigorously support and help relevant green building materials enterprises, not only in terms of funding, but also in terms of technology. Relevant enterprises should also actively research, develop and innovate traditional building materials, and on the basis of learning western advanced technology, According to the actual situation of our country, we have developed a road for the development of the construction industry with Chinese characteristics.

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