

Research on Energy Conservation and Green Environmental Protection Technology in Civil Engineering Construction

Mengran Gao

Zhengzhou Business University, Zhengzhou, Henan, 451200, China

Keywords: Civil engineering, green and energy-saving technology, analysis

Abstract: In recent years, China's social and economic development level continues to improve, but with the ecological environment problems are increasingly serious, as a huge resources of civil engineering, must realize the current construction defects and deficiencies, and comply with the economic environmental requirements, innovation construction, introduce and implement the green construction technology, the ecological concept throughout the whole civil engineering, to realize reduce unnecessary resource consumption, reduce the pollution of ecological environment. In the project, the staff should uphold the concept of environmental protection, actively learn the new green technology, improve the utilization rate of resources, contribute to China's ecological and environmental protection work, and make contributions to the sustainable and healthy development of the construction field. The application of energy saving technology will also be analyzed in civil engineering below, hoping to provide suggestions for the corresponding personnel.

1. Introduction

In recent years, China's ecological and environmental problems have become more and more severe, the natural environment deterioration, the lack of natural resources, these serious situations are not conducive to the smooth progress of China's sustainable development work. As a huge energy consumption of civil engineering, must bear the brunt of innovation and optimization, realize their own resources consumption, completes the relationship between civil engineering construction and ecological environmental protection coordination, avoid unnecessary waste of resources in the construction process of caused, realize the resource utilization and environmental protection results both progress. Based on this, this article will analyze the significance and value of green energy-saving technology, and put forward its application measures in civil engineering. I hope that under the discussion of this paper, the corresponding staff can provide suggestions and ideas.

2. Application value of energy-saving and green and environmental protection technology

2.1 It is conducive to optimizing the living environment

Modern social environment, the people pay close attention to the quality of life and social

environment, to improve the standard of quality of life continuously, so in the process of civil engineering construction, should also be the goal of the people as the principle of construction work, civil engineering construction can achieve the dual goal of ecological and health, meet the requirements of the masses, optimize the living environment of the masses. According to the actual use standard of technology, if the introduction of green technology in civil engineering construction, not only can only effectively optimize the application of building materials, but also improve the effectiveness of engineering construction, effectively realize resource conservation and ecological environment protection, and achieve the goal of improving the quality of life and building energy efficiency of the masses.

2.2 Beneficial to promoting the development of engineering construction

The scientific application of technical means can achieve the goal of promoting the development of civil engineering. With the promotion of green environmental protection and advanced technology, civil engineering will continue to move towards the trend of environmental protection, and the energy consumption in the overall construction process of civil engineering will also be effectively controlled. Because the overall construction operation of civil engineering requires more energy, the scientific control of energy consumption can provide a driving force for the project construction, ensure the overall effect of China's engineering construction, and bring positive and beneficial effects on the development of the society.

2.3 It is conducive to achieving sustainable development

The construction of civil engineering needs to put and consume a lot of energy resources. Most of these resources are not renewable capacity resources. If the cost is huge, it will inevitably lead to the energy shortage and severe resource situation in China. However, under the promotion of green technology, civil engineering construction can effectively alleviate the large cost of resources, and the engineering construction mode will also be optimized and innovated, laying a foundation for the sustainable development of the construction field and the sustainable development of the society, and realizing more benefits for civil engineering^[1].

3. Status quo of green construction of civil engineering

3.1 The idea of green and environmental protection is weak

Under the background of the rapid development and progress of social economy, the number and scale of civil engineering continues to expand, in the process of various types of civil engineering construction, the construction unit if can fully use and implement the green environmental protection ideas, so inevitably can stand out in the fierce competition, get the development and optimization. In fact, a large part of the construction unit in the process of civil engineering construction, the environmental protection and ecological consciousness is weak, makes the lack of work for the actual engineering scientific control, green concept is not deep into engineering every link and process, it will hinder and limit the engineering construction smoothly. Because they do not have the concept of ecological and environmental protection, all departments and staff of the construction unit have not actively and independently put into the green operation, and still use the previous backward extensive management mode, which will inevitably make the construction unit incompatible in the sustainable development society, thus being eliminated by the market^[2].

3.2 Construction quality is not up to standard

Part of the construction unit in the long process of development, although also realized the key role of ecological environmental protection, also has the basic energy conservation ideas, but in the actual civil engineering, the application of energy-saving materials still have more significant quality problems, more even, in the process of green technology, not according to the corresponding specification requirements to engineering operations, make civil engineering under the background of the application of green technology quality defects. Although in the current process of rapid progress in the construction field, green technology is more and more diversified, each technology still has its particularity and has not completely formed a consistent quality index, which makes the quality problems emerge in the process of technology use, which seriously affects the quality of the project.

4. Application of energy-saving technology in civil engineering

4.1 Application of environmental protection technology in doors, windows and wall construction

As an important medium connecting the whole building structure connecting the external environment and the internal environment of the building, doors and Windows are the part that must be paid attention to in the process of engineering construction process. First of all, the staff in the process of installing doors and Windows, should make good use of sealant, and according to the actual situation, the application of broken bridge aluminum structure component engineering work, the author compares the fixed, pull and open type of window, found that fixed window has the best energy saving effect, and other types of window compared to energy saving effect is not significant. Secondly, according to the actual construction situation of civil engineering, the staff in the process of designing doors and Windows, should be on the basis of ensuring excellent lighting and ventilation ability, reasonable design of window-wall ratio orientation, which is also beneficial to meet the goal of energy conservation. Finally, according to the actual situation, the relevant green technology into it, can also achieve significant results. Such as broken hot aluminum material, polyurethane foam are common and easy to use materials, in addition, the glass color, coating treatment, or the use of hollow structure, multi-level glass window, also can play a significant role in energy saving. The staff should control the coordination degree between doors and Windows and external walls, and choose to use excellent alloy materials to expand the production of doors and Windows, so as to improve the closure degree of the overall structure of the building^[3].

4.2 Wall thermal insulation technology

Wall, as the key composition of the whole building structure, is also an important link in the application of green technology. The wall engineering quantity is large, and the green technology is mainly used in the improvement of heat insulation level in the wall construction operation. In the current period, the construction personnel will mostly choose in the wall in the process of the work, in the interior of the wall or wall surface design corresponding insulation materials, to promote the wall with insulation ability and heat isolation ability, on the heat conduction way of building internal heat loss effectively control and reduce, to reduce unnecessary resource consumption, realize the scientific control of temperature. At present, wall thermal insulation technology has obtained a large-scale application in the field of civil engineering. Its main application methods are divided into internal thermal insulation technology, external thermal insulation technology and internal hybrid technology because of the different points of thermal and external material planning.

In the current period of the use of all new wall materials, it is very widely used with autoclaved aerated concrete, because this material has significant advantages, such as excellent thermal insulation ability, light material texture. In general, in the construction process of civil engineering construction, the goal of energy saving can be achieved by using autoclaved aerated concrete, which can also scientifically solve the industrial waste residue, rationally allocate resources, and effectively realize the field of civil engineering toward the trend of environmental protection. But it is important to note that the staff in the application of autoclaved aerated concrete, first of all, because the material has large pores, which makes the material capacity is poor, but also insufficient than concrete general weight, so the autoclaved concrete has a low thermal conductivity, in the application process should pay attention to its proper storage. Secondly, in the production process of this material, it consumes less resources than the clay bricks. Because of the low density of autoclaved concrete, it can save a lot of land resources and effectively avoid the situation of resources consumption, so it is widely used in engineering.

4.3 Solar energy technology

Among the natural resources, solar energy has the advantages of green, pollution-free, renewable and repeated utilization. In today's era when resource depletion and environmental problems have become more and more prominent, solar energy has been widely used in various fields. In the civil engineering construction, solar energy has long been introduced and applied, and has obtained the corresponding results, the use of solar water heater, is one of the most common ways. In the current period, the construction of the roof, facade curtain wall and other parts of the construction process, the application of new photovoltaic materials, the material can effectively collect solar energy, and through a certain way to collect good solar energy into electricity, provide stable power for the building, on the premise of meet the building foundation function, to achieve the goal of green pollution-free^[4].

Texas micro row building, for example, it is the world's largest solar buildings, sun altar micro row building a total construction area of 75000 square meters, in the world to realize the solar hot water supply, heating, refrigeration, photovoltaic grid technology and building, building overall energy saving efficiency of 88%, can save 2640 tons of standard coal, 6.6 million degrees, reduce emissions 8672.4 tons, is the world initiative to realize the solar water heating, heating, refrigeration, photovoltaic grid technology and building^[5]. As shown in Figure 1.



Figure 1: Texas Micro row Building

4.4 House roof insulation technology

Housing is in the process of civil engineering construction, a key part of the green technology

application, first of all, considering the building roof will usually bear the influence of solar radiation, solar light, rain erosion factors, so the staff can try to green design on roof structure, round, pointed scheme design on the roof parts, in this way to scientifically adjust the temperature in the building. Secondly, in the selection process of materials, the staff can also adjust and optimize the actual situation, can take the new green materials with low thermal conductivity as the first choice, apply them in civil engineering, to achieve the goal of warm in winter and cool in summer; again, for other parts of energy saving and environmental protection technology can also be appropriately introduced and applied, such as insulation and moisture-proof composite materials between the roof insulation layer and moisture-proof layer, which not only effectively meet the aesthetic requirements, but also effectively promote the overall building comfort and green ecological requirements and standards. Finally, the foam glass roof insulation system with strong safety and excellent environmental protection performance can also be a very popular environmental protection technology in recent years, and the staff can effectively use it according to the actual situation of the project, so as to achieve the goal of green environmental protection.

4.5 Promote new technologies and energy applications

Bare earthwork treatment. Staff in the process of civil engineering construction, will inevitably cause a lot of bare earthwork, if civil engineering is in the densely populated area, then will be very likely due to a lot of dust, the dust will not only make the ecological environment pollution, but also will cause interference to the actual life of the people around, so must do a good job of bare earthwork. Workers can use all new materials to spread the earthwork to minimize pollution.

Construction scheme optimization. First of all, the staff should organize the introduction and application of the new green materials, and immediately analyze and study the very possible pollution situation in the civil engineering, so as to ensure the scientific and efficient engineering scheme design, and do a good job in environmental pollution control. Secondly, the staff should do a good job in the construction technology inspection, the first time to adjust and optimize the technology with strong pollution nature, and make technical disclosure, to ensure that each work process and links can be efficiently completed with the boost of green technology. For example, the staff can add a certain amount of fly ash in the process of concrete production, through this way to achieve the goal of improving the concrete thermal insulation capacity, to achieve excellent environmental protection results, to ensure the social benefits and environmental benefits of civil engineering^[6].

4.6 Improve the material utilization rate

The author investigated a large number of civil engineering actual construction situation analysis learned that in the engineering construction environment, will produce a lot of waste materials, and the waste materials can still have the value of reuse, its application in civil engineering other operation link, can effectively ensure the high quality of building materials reuse, to realize the goal of saving resources. In order to ensure the scientific application of green technology in engineering projects, construction enterprises should effectively dispose of the waste materials of the project, and form unified disposal of waste materials. In, for example, the actual construction process of a civil engineering, the staff use crusher, will waste gravel and brick crushing processing, after it as sand raw materials, through repeated processing of waste construction building materials, can significantly reduce the cost of resources, effectively save the cost of civil engineering construction. In order to ensure the practical implementation and efficient utilization of green technology in civil engineering, it is necessary to build enterprises to clarify the requirements and standards of green environmental protection development according to the development requirements and steps of The

Times, and use all kinds of waste with high quality. In addition, the construction unit should also introduce and apply new energy saving facilities, so as to improve the staff's awareness of environmental protection ideas, so that the construction personnel can fully realize the key significance of scientific application of energy saving technology, to ensure that the cost of resources is implemented.

For example, Hangzhou Low-carbon Science and Technology Museum is designed and constructed according to the "national green building three-star" standard, which is a veritable low-carbon building. With a total construction area of 33,700 square meters, local building materials will be selected first to reduce carbon emissions during material transportation; natural and recyclable materials will be selected; and curtain walls will use solar photovoltaic materials as much as possible. The museum, which is expected to be completed in 2011, and will be the world's first low-carbon-themed science and technology museum. As shown in Figure 2.

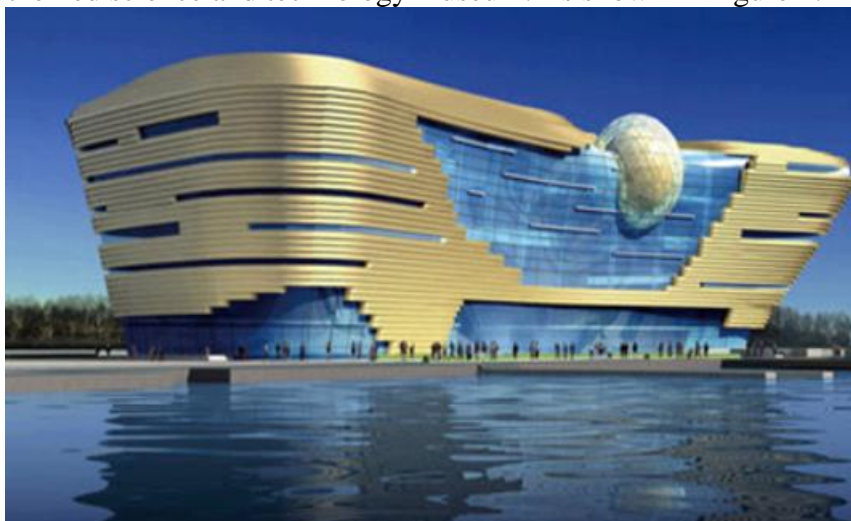


Figure 2: Hangzhou Low Carbon Science and Technology Museum

5. Measures to improve the quality of green technology application

5.1 Increase the intensity of publicity of environmental protection concept

In order to alleviate the weak situation of green ecological environmental protection staff, In the actual process of civil engineering construction, Managers should actively carry out environmental protection publicity work, The First up, then, Staff should be regularly organized to join in a variety of environmental protection and green training activities, With the help of the training activities, To help the staff to truly realize the important role of environmental protection, And the key significance of applying green technology in the construction process, Through the detailed division and implementation of environmental protection responsibilities, Improve the functional thought of the staff, To ensure that the staff can independently and actively put into the process of environmental protection work, And a deep and comprehensive study of a variety of environmental protection technologies, To improve the high-quality application of green technology. Second, we should combine the characteristics of civil engineering and the construction content of the project to help the staff to clarify the key process and links to be managed in the process of the project, to ensure that the staff can independently conduct the use of various energy-saving technology, so as to achieve excellent environmental protection results.

5.2 Raw material management well

The control of raw materials is the basis for the effective application of green technology. In the process of actual management, managers should first control the limit of raw materials, and purchase raw materials according to civil engineering standards, engineering content and other factors. Secondly, when launching the material to receive, we should also record and record the actual situation of the material in each field carefully and comprehensively, at the same time, we should not meet the requirements of the material for the first time, to avoid the situation of random collection or waste of materials at will, to ensure the utilization rate of raw materials. Finally, we should do a good job in the recovery of material recycling system and recycling system construction, reasonable reuse and recycling of materials work, to ensure that every building materials can be used in all aspects. In civil engineering demolition and installation projects, personnel with strong professional ability should be assigned to carry out various engineering operations, so as to ensure the added value of materials and ensure the maximum play of their added value.

5.3 Create a complete energy-saving management and control system

In order to ensure that civil engineering overall construction results, it should be in the project construction process, create a comprehensive control system, clear division of work functions and power, through creating and establish related rewards and punishment mechanism, to achieve the whole scientific implementation of energy saving technology, ensure the smooth application of energy conservation technology in civil engineering. In addition, should also strengthen the supervision and management of civil engineering green technology application status of strength, the engineering construction of resource consumption, etc., and ecological environment pollution serious punishment, management department should also do a good job of energy conservation, environmental protection thought to implement in every detail and every person in the heart, improve the quality of green technology application.

6. Conclusion

To sum up, civil engineering must recognize the severity of the environmental problems at the present stage, and focus on their own actual situation, to develop green ecological engineering. The author studies and investigates the actual situation of civil engineering at the present stage, and finds that although some projects have introduced and applied the corresponding green technologies, there are still unreasonable and unscientific cognitive aspects, which all affect the construction of civil engineering. Civil engineering must, on the basis of ecological and environmental protection, change the construction ideas, rationally apply the green technology, improve the environmental protection efficiency, deepen the ecological significance, and lay the foundation for the smooth progress of the project.

References

- [1] Duan Haotian, Liu Xuerui. *The Application of energy-saving and environmental protection technology in Civil Engineering Construction* [J]. *Jiangxi Building Materials*, 2019 (04): 116 + 118.
- [2] Feng Yulong. *A Brief Analysis on the Application of Energy Conservation and Environmental Protection Technology in Civil Engineering Construction* [J]. *Theoretical Research on Urban Construction (electronic edition)*, 2019 (12): 173-174.201912150.
- [3] Sun and Fa. *Analysis of energy-saving and green environmental protection technology in Civil Engineering Construction* [J]. *Modern Property (journal)*, 2019 (04): 95.
- [4] Chen Yang. *Analysis of the application of energy-saving and environmental protection technology in civil building construction* [J]. *Theoretical Research on Urban Construction (electronic edition)*, 2019 (11): 162.201911144.

- [5] Zhang Cui, Chen Peng. *Analysis of energy saving and green environmental protection technology in civil Engineering Construction [J]. Modern Property (journal), 2019 (03): 217.*
- [6] Li majestic. *Application of energy-saving and environmental protection technology in Civil Construction [J]. Engineering technology Research, 2019,4 (05): 41-42.*