The development of green building technology

Yiyang Wei
Mawei Town, Mawei District, Fuzhou, Fujian Province, China
Room 3002, Building 10, Mingcheng Longyu, Baozhen Road
Email: Ame262173@163.com

Abstract. Green building has become a trend of sustainable building development in the 21st century. An important indicator to measure the development of society is the buildings index. Global requirements for buildings are also gradually improving, and the construction industry accounts for one third of the total world consumption. It is necessary to re-examine the consumption mode and ecological significance of the construction industry in the process of construction and use and abandon the traditional construction technology mode with high pollution and energy consumption. It is necessary to develop green building technology. It refers to a building technology model that has no harm to the environment which can fully utilize the environment and resources and does not destroy the basic ecological balance. In the new century, Chinese buildings should no longer follow the old development pattern of high pollution and high energy consumption. It is the only way for Chinese buildings to develop by studying green building technology and building green buildings.

1. Background

Environmental Background. Nowadays, energy resources consumption has become a prominent problem in sustainable development. Ecological imbalance, resource depletion and climate warming have all become serious challenges. The productive forces are closely linked with the earth's resources and ecological environment. The earth's resources are limited and cannot meet the energy demand caused by the development of the economy at the expense of the environment indefinitely [1-4]. The best solution at present is to change the existing pattern of social and economic development. Studies show that energy consumption and greenhouse gas emissions from buildings account for more than a quarter of the world's total energy consumption.

Industry Background. Green building technology is developing vigorously and bringing forth the new. Although there are still many challenges, the continuous development of technology brings many opportunities for green building technology [5]. However, the application of green building technology will inevitably bring about an increase in costs. In different projects, the cost of green building is usually 10% higher than that of a conventional building. Therefore, some studies conclude that the cost of green building technology has become an obstacle to the development and promotion of green building technology.

1.1. Research significance

The significance of the existence of green buildings is to ensure the sustainable development of the environment and provide a healthier environment for people. It is important to explore green building technology and promote the development of green building technology, which plays an indispensable role in environmental protection and ecological development [6-9]. Green building is the inevitable direction of the future development of the construction industry. However, the development of green building technology has been encountered by many obstacles.
1.2. Industry Background

The concept of green and sustainable development has been integrated into all walks of life. The sustainable development problem faced by the construction industry is even more serious. At present, green building technology is developing vigorously and bringing forth the new. Although there are still many challenges, the continuous development of technology brings many opportunities for green building technology [5]. However, the application of green building technology will inevitably bring about an increase in costs. In different projects, the cost of green building is usually 10% higher than that of conventional building. Therefore, some researches conclude that the cost of green building technology has become an obstacle to the development and promotion of green building technology.

![Fig 1. Pollution caused by buildings](image)

2. Development history and specific application of green building

For realizing the natural resources’ sustainable development, the development and application of green building technology have become an inevitable trend. In the construction process, natural resources, human health and social utilization are fully considered and taken into account. Green buildings also cost less to build and maintain.

Development and application of green building construction technology. Green building refers to a balance of ecological environment of the basic premise to give full play to its biggest resources environment, and gradually become concerned about the environment and human's life experience research system, our country also issued relevant laws and regulations, to promote the development of support for green building. In recent years, the focus of green building in China has always been on materials, energy-saving equipment, optimization of building structure form, etc. Through the analysis of various promulgated laws and policies and the status quo of green construction technology theory research, it is found that in many buildings, the biggest negligence is the construction link. The construction industry is used to focusing on the design of green buildings, ignoring the innovation and development of the construction stage, then causing a large waste of natural resources.

Disadvantages of traditional construction technology. Different types of machinery produce different levels of noise. Among them, the most serious noise is the refurbishing machine, which can be as high as 86–95dB. The noise from many municipal projects has seriously affected the living environment of citizens. Dust pollution is the most important construction pollution. It mainly comes from the removal of abandoned buildings and the transportation of demolition materials, the structure of new buildings, sand transportation, compaction, etc. There is also waste gas pollution from building paints, coatings, etc.

Building construction technology based on the concept of green ecology. To reduce pollution to the environment in the process of transport, for the transportation of materials, sealing treatment must be carried out to avoid flying around during transportation. Dust height shall not exceed 1.5m in the working area, and it shall be ensured not to spread out. Easy to produce materials must use stacking cover measures, or directly use closed treatment. Monitor the noise on-site in strict accordance with national standards. Based on satisfying the construction efficiency and schedule, less noise equipment needs to be selected, and sound isolation measures should be adopted to reduce the noise pollution. Sewage discharge must meet the national standard, and different treatment and discharge measures.
should be used for sewages. For example, set up grease traps, sedimentation tanks, septic tanks, etc. Strict water quality monitoring shall be carried out before the discharge of sewage and submitted an authoritative quality inspection report. Besides, during the construction, choose slope support technology with good water-proof performance as far as possible. If the water resources in the construction area are insufficient or the groundwater level is low, the utilization of water resources should be conserved.

All links in the construction process need to meet and meet national and local standards. Technological management should be adopted to minimize the impact on the environment and save resources. The Construction management system and the corresponding objectives should be formulated. The contents of the construction plan should including develop an emergency rescue plan, reduce the environmental load, protect the cultural relics, and save materials. Besides, enhance the internal management and self-evaluation of the entire construction process. The contractor should cooperate with different units actively to guide, supervise, and evaluate the construction, and need focus on the environmental control and cultural relics protection. Energy-saving and utilization also should be considered during the construction process.

Give full play to the supporting and guiding role of the government. The green building construction technology has far-reaching influence on sustainable development of the construction industry. To realize the green and environmental protection of building construction technology, the constructions must have the guidance and support of the government, through standardize the technical content, encourage the development of technology, provide the corresponding platform.

3. Improvement and significance of green building technology

3.1. Improvement and significance
The basis and prerequisite for the wide application of green building technology in various fields is to reform the promotion mode of new building technology and strengthen the innovative application of the technology. At the present stage, the departments of technology development and application in China are not clear about the classification of technology, which leads to the unclear division of labor among departments and low work efficiency, which will also have a certain impact on the promotion and application of green construction technology. Relevant scientific and technological departments should also actively innovate and reform, and establish a sound mechanism for promoting green building technologies. In the process of promoting green and energy saving technologies, a combination of various promotion means and promotion channels can expand their application scope to a certain extent. Nowadays, people pay more and more attention to the issue of resources and energy, green building construction technology is the inevitable trend of the development of the construction industry. In the construction process, natural resources, human health and social utilization are fully considered and taken into account. Green buildings are cleaner and healthier for users and the environment, and occupy less resources.

At present, the research on green building technology in China has achieved initial results. Nowadays, green building technology as a technology model of energy conservation and emission reduction has been paid more and more attention by many countries. Green building technology plays an important role in promoting the transformation of construction industry, protecting natural resources and environment and improving people's life quality. The direction of residential construction in the new century is to reduce energy consumption, save resource consumption and provide indoor living environment quality. Energy-saving building technology is gradually becoming the pioneer of real estate development industry.

3.2. Engineering example
Located in Pudong, Shanghai Zhangjiang electric port office center has carried out renovation and decoration design for six office buildings, with a total construction area of 23000 square meters. Combining with its own conditions, combining advanced ecological technology design at home and abroad with architecture and landscape, creating a high-technological industrial park with energy conservation.
The exterior wall adopts the thermal insulation structure with excellent performance, the roof adopts the high-efficiency planting insulation roof, the glass curtain wall with high thermal insulation and high air tightness (including breathing curtain wall), and the external facade is considered to adopt the movable external sunshade with beautiful effect, so as to reduce the overall heat insulation effect of the building in summer and not affect the heating demand of the building in winter. The cold and heat sources of heating and air conditioning in atrium of building AB are mainly provided by ground source heat pump system. The energy consumption of ground source heat pump, heating and air conditioning system and other energy consumption of lighting system are provided by solar photovoltaic system. Through the comprehensive utilization of ground source heat pump system and solar photovoltaic, the atrium of building AB can achieve self-sufficiency and zero energy consumption.

The real-time monitoring of building operation parameters, through the layout of building monitoring system, realizes the collection of building information data and intelligent monitoring, reflects the building energy consumption status, energy saving rate, water saving rate and other operating parameters in real time, and automatically controls the equipment operation status according to the actual situation.

4. Summary
Due to the research and practice of green building technology in China is still in its infancy, a complete theoretical system has not been formed, and practical experience is also relatively scarce. The urgent task is to carry out a comprehensive, multi-level and overall theoretical system research on the basic systems science. Secondly, the quantitative research of green building indicators, the formulation and promulgation of relevant evaluation standards and norms should also be put on the agenda.

The development of green building technology is a systematic and complex problem. In order to construct a more ideal green building technology selection method and optimize the application policy of green building technology, the future research of green building technology needs to focus on the evaluation criteria of green building technology applied to different types of buildings.

5. References
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