

# Research on Quality Management Measures of Green Building Construction

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**Abstract:** Urbanization has led to the rapid development of the construction industry. However, this has also led to higher requirements for the construction engineering management. Other than the quality monitoring of engineering construction, the energy-saving properties of the building should also be considered. Therefore, a scientific management approach should be adopted to improve green building management. This paper primarily examines the importance of quality management in green building construction, along with the factors influencing it. It also identifies the quality issues present in current green building construction. Finally, it proposes measures for quality management in the green building construction process to facilitate the industry's healthy development.

**Keywords:** Green building engineering; Construction process control; Quality management; Construction publicity

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## 1. Introduction

In the green building construction process, the quality control of each construction phase directly impacts the overall project quality. Therefore, comprehensive quality control measures should be implemented across all aspects of management. This involves adopting scientific management techniques to enhance the quality management of each construction phase. Furthermore, both quality management personnel and construction workers should enhance their understanding of green construction principles and their overall proficiency in green construction practices. This can be achieved by introducing advanced green energy-saving technologies and utilizing eco-friendly materials. By improving the construction efficiency of green building projects through these means, the quality of construction can be ensured.

## 2. Significance of green building construction quality management

### 2.1. Reducing construction interference

In traditional building construction, to improve construction efficiency, waste treatment is less emphasized, resulting in problems like solid waste, wastewater, dust, light pollution, noise pollution, etc. These problems can significantly impact surrounding residents and disrupt the original ecological environment of the construction

site. Green building construction, through the application of green technology, offers a solution to these challenges. By adopting eco-friendly practices and utilizing sustainable materials, green building projects can effectively improve environmental protection efficiency and reduce ecological pollution caused by construction activities <sup>[1]</sup>. Green construction management can reduce pollutants through systematic constraints, minimizing the impact of construction projects on residents and maintaining a healthy ecological environment system.

## **2.2. Maintaining corporate image**

The scientific and standardized nature of the construction management system is essential in green construction. Besides, it is also necessary to pay attention to public opinion to ensure continuous improvement in management quality. From an economic standpoint, adopting green management concepts and methods helps conserve land resources, water resources, and construction materials, leading to cost savings. This approach also reduces the waste of social resources. In terms of social benefits, the green building concept emphasizes public opinion and addressing the needs of society. This not only contributes to public environmental protection efforts but also enhances the corporate image.

## **3. Influencing factors of green building construction management quality**

### **3.1. Construction materials and equipment**

In green building construction, quality control of construction materials and construction equipment is vital to ensuring the overall construction quality. Construction materials constitute the main body of the building, and any substandard quality or presence of toxic substances within them can significantly compromise the quality of the green building project, making it difficult to meet green building standards <sup>[2]</sup>. Similarly, construction equipment plays a crucial role in facilitating construction progress. If there are issues with construction equipment or their performance does not align with construction requirements, it can adversely affect construction efficiency and quality. Therefore, it is essential to consider various factors comprehensively when selecting construction materials and equipment. This includes ensuring the durability of materials and equipment, their environmental friendliness, and their alignment with the construction project's requirements. By avoiding the use of substandard construction materials or equipment on-site, the quality of green building construction can be maintained and upheld.

### **3.2. Construction technology**

The integration of green building construction technology offers significant benefits in terms of improving the efficiency and quality of building construction. Beyond focusing solely on construction quality, green construction technology also prioritizes environmental protection. It effectively addresses issues such as sound and light pollution, noise pollution, and dust pollution, thereby controlling pollution problems associated with building construction and promoting the adoption of green building principles. From an energy-saving perspective, the application of green building technology involves the use of water-saving techniques and material recycling technology. This not only reduces construction costs but also minimizes resource wastage. By implementing these environmentally friendly practices, green building technology contributes to sustainable construction practices and helps mitigate the environmental impact of building projects.

### **3.3. Construction management awareness**

In the realm of green building construction, instilling a robust sense of construction management awareness serves as the foundation for effective project implementation. Therefore, when focusing on quality management

throughout the green building construction process, it's imperative to begin by nurturing this awareness. Every individual involved in construction and management within the enterprise should adopt a mindset aligned with green construction principles. Through pre-construction training sessions, meetings, and ongoing communication efforts, the concept of green construction should be firmly integrated into the mindset of personnel. By consistently emphasizing and implementing these principles, potential safety hazards in green construction can be mitigated, ensuring the successful execution of environmentally friendly building projects <sup>[3]</sup>.

## **4. Problems in construction management**

### **4.1. Insufficient awareness of green building construction**

In green building construction, a significant challenge persists due to inadequate awareness of quality management among constructors. Neglecting the control requirements of green construction often results in material and energy waste, as well as pollution during construction processes. For instance, wire fasteners are commonly used in building construction, with significant quantities employed at relatively low individual prices. However, there's a tendency for construction personnel to overlook the importance of wire fastener conservation, leading to substantial losses as a result of direct disposal without recycling. Engineering surveys reveal that over 50% of wire fasteners are lost in this manner. Recycling all wire fasteners could yield significant cost savings, potentially amounting to tens of thousands of dollars <sup>[4]</sup>. Moreover, some enterprises fail to prioritize the use of green construction materials during construction, with construction management primarily focused on economic benefits rather than considering long-term utilization. For example, reluctance to adopt new construction processes despite their potential benefits, such as shortened construction periods and reduced costs, undermines the long-term development of enterprises. Embracing innovative processes not only saves construction costs but also minimizes waste, aligning more closely with the principles of green construction. Addressing these challenges is crucial for advancing the development of green building practices <sup>[5]</sup>.

### **4.2. Improper management of construction personnel**

In the construction of green building projects, construction companies commonly face challenges in specifying the number of construction personnel, leading to difficulties in labor cost control. Often, once a portion of the project commences, the construction work is delegated to a construction team, which executes the project according to their preferred methods. This decentralized approach can result in ineffective labor cost control and wastage. Moreover, an excessive proportion of non-construction personnel within the enterprise can further burden construction activities <sup>[6]</sup>. Additionally, instability in the team structure of construction personnel poses a significant risk to quality control in green project construction. Frequent personnel turnover can disrupt construction quality control due to new personnel's lack of familiarity with construction methods and processes. Addressing these issues is crucial for ensuring efficient and effective construction practices in green building projects.

### **4.3. Improper selection of green construction methods**

The implementation of green building construction methods demands a high level of precision and integration with construction programs to ensure the rationality of construction processes and methods. Unfortunately, in specific construction scenarios, the adoption of unscientific construction methods often leads to numerous challenges in construction quality and schedule management. This can result in increased construction costs and losses <sup>[7]</sup>. For example, clear quality control objectives and regulations are often lacking during the pre-construction phase. Additionally, there may be inadequate measurement of cost, quality, and duration for green construction projects. Blindly rushing or overly emphasizing cost control can lead to safety hazards

and unnecessary cost escalation. Moreover, as construction technology continues to advance, the level of professionalism required in the modern building construction industry is increasing. Each profession has specific technical requirements that must be met to ensure successful construction. Proper coordination and cooperation between different professions are essential to achieve this. However, if construction technology details are overlooked, it can lead to construction issues and increase the complexity of the project.

## **5. Green building construction quality management measures**

### **5.1. Strengthening green construction publicity**

Managers and construction personnel play a crucial role in implementing green construction practices aimed at cost reduction and energy efficiency. Strengthening construction management, fostering technological innovation, and elevating the level of green construction are essential steps to laying a solid foundation for the long-term and stable development of the green building industry. However, the current structure of the construction industry often lacks personnel with a strong understanding of green construction concepts, thereby hindering the effective implementation of green construction practices<sup>[8]</sup>. To enhance the efficiency of green building construction, it's essential to focus on publicizing and educating construction personnel about green construction principles throughout the entire construction process. Enterprises can establish a green construction management system with dedicated function points related to green construction. These points can include personal information of construction personnel, personal logs, and other relevant data to track and share daily training activities and information about green construction practices. By doing so, the awareness and understanding of green construction among building construction personnel can be enhanced. Additionally, enterprises should regularly conduct green construction case analysis activities to showcase the application of green construction technology and the resulting achievements. This ensures that construction personnel remain up-to-date with the latest advancements in green construction technology, fostering a culture of continuous improvement. By promoting the importance of green construction and encouraging its rigorous implementation, construction personnel can actively contribute to the advancement of sustainable building practices<sup>[9]</sup>.

### **5.2. Constructing a scientific green management system**

To ensure the effective implementation of green construction management, it's essential to establish a comprehensive green management system. This begins with meticulous quality control during the construction preparation stage. Before commencing construction, a thorough investigation of the construction site is imperative. This includes understanding the geographical features, climate conditions, water resources, transportation accessibility, and raw material supply availability. By conducting a thorough site survey, construction programs can be optimized to mitigate potential environmental impacts during later construction stages. Prior to building construction, a detailed review of construction processes should be conducted to assess current construction technologies, methodologies, and any existing challenges. This serves as the foundation for subsequent construction tests. Understanding the construction process in advance enables the design of optimal construction conditions, aligned with project requirements. Construction process design should be tailored to the project's characteristics, optimizing processes within the constraints of the construction enterprise to formulate the most scientifically and reasonably planned construction design. Effective construction procurement management is crucial. This involves budgeting for construction materials and equipment procurement in accordance with construction progress. Material procurement plans should ensure adequate reserves and manage consumption quotas to maintain material consumption plan rationality. Material quantity and quality should be audited before entry, ensuring adherence to standards. Equipment selection should align with design

specifications, construction progress, and other project requirements. By implementing these measures, the green construction management system can effectively support the smooth execution of green building projects.

Besides, the responsibility of construction quality control should be clarified. This involves effectively dividing the production quality control responsibility among each functional department involved in construction and refining construction management responsibilities to specific departments and individuals. This delineation ensures clarity regarding the relationship between personnel in each department and guarantees the rationality of quality management procedures and methods. Pre-service training should be strengthened to enhance construction personnel's awareness of green construction quality control and their proficiency in green construction technology. Post-training efforts should focus on organizing training sessions covering various aspects of green construction, thereby improving the construction quality control abilities of personnel. Furthermore, it is essential to enhance control over green construction quality information. Construction site management personnel should diligently collect and analyze management information and process information related to construction site management. By doing so, problems that may arise during construction can be promptly identified and addressed.

### **5.3. Focus on green construction quality control**

A critical aspect of green building construction quality control is the effective supervision of construction materials. It is essential to synchronize material usage planning with construction progress and ensure the accuracy of material quality control across different construction phases. At the beginning of the project construction, it is crucial to diligently implement the construction plan to prevent procurement duplication. Prior to procurement, thorough market research should be conducted to ensure access to the necessary bulk materials. Ideally, these materials should be transported to the site approximately 10 days before construction commences to guarantee timely supply. Prolonged delays in material delivery not only increase material management costs but also occupy significant space at the construction site, tying up construction funds, and posing logistical challenges. Before materials enter the site, their quality and specifications should be verified to prevent losses resulting from purchasing errors or changes in material quality <sup>[10]</sup>. Furthermore, robust management of personnel involved in green construction projects is paramount. Construction personnel are integral to implementing construction processes, and the stability of the workforce and their skill level directly influence construction quality. Thus, proactive planning of personnel should ensure that all individuals possess the necessary technical expertise. Utilizing scientific and humane management techniques can help reduce personnel turnover rates, ensuring continuity and consistency in construction efforts.

### **5.4. Adopting scientific construction methods**

The application of scientific construction methods can ensure the quality control of green building construction. First of all, the use of scientific waste disposal methods. Firstly, employing scientific waste disposal methods is paramount. The construction of buildings generates a significant amount of waste, and if not managed effectively, this can compromise construction quality. In green construction, waste is sorted and processed, with recyclable and non-recyclable materials separated and utilized accordingly. This approach minimizes resource wastage and promotes the adoption of green construction technology. Additionally, specialized treatment is employed for toxic waste to prevent environmental hazards. Secondly, adopting scientific water-saving construction methods is essential. The construction of buildings consumes substantial water resources, necessitating effective water conservation measures. Through the implementation of water-saving programs and adjustments to construction processes, water resource consumption can be minimized. This includes establishing cyclic water use systems to maximize efficiency. Moreover, leveraging energy-saving construction

technology is critical. Building projects consume significant amounts of energy, contributing to overall energy consumption. To address this, renewable resources such as wind and solar energy can be utilized to replace non-renewable energy sources. Additionally, energy-saving materials can be employed to reduce energy consumption post-construction. For instance, installing intelligent temperature control systems and heat-insulating materials can optimize indoor temperature regulation and decrease energy usage.

## 6. Conclusion

Green construction management work is conducive to reducing energy consumption, conserving construction materials, and minimizing pollution compared to traditional construction management practices. However, there are still numerous shortcomings in the quality control of green construction engineering that hinder its effectiveness. To address these challenges, it is essential to enhance construction awareness, refine construction methods, and optimize management systems based on the concept of sustainable development.

## Disclosure statement

The authors declare no conflict of interest.

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