

# Shallow Analysis on Management Control Points and Control Measures of Prefabricated Building Engineering

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**Abstract:** Since entering the new era, the scale and number of construction projects have continued to increase, and traditional construction methods have been difficult to meet the current production and development needs. Against this background, prefabricated building engineering has been widely used, featuring obvious advantages of controllable quality and short construction cycles. However, in the application process, this new construction method also has restrictive factors such as high difficulty and high cost, making it difficult to achieve predefined goals. Based on this, an in-depth analysis of the management control points of prefabricated building engineering can summarize effective control measures, thereby exerting its application value and effectively promoting the development of construction projects in China. This article researches the management control of prefabricated building engineering and proposes corresponding viewpoints.

**Keywords:** Prefabricated building engineering; Management control; Control measures; Research

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## 1. Introduction

At present, prefabricated buildings have been widely applied. It is mainly a construction method that assembles and connects prefabricated components at the construction site, which has greatly improved the overall benefits of construction projects. However, there are corresponding problems in the process of its popularization and application. Exploring effective management control points and control measures has become a key research topic in the field of construction. In order to achieve the set goals, relevant management personnel need to adapt to the development of the times actively, focus on the current situation of prefabricated building project management, and constantly adjust and improve based on the actual situation, to improve the project quality and provide sufficient guarantee for the development of this industry<sup>[1]</sup>.

## **2. Brief analysis of the application value of prefabricated building engineering**

### **2.1. Substantially enhancing the overall safety of construction projects**

In recent years, China's construction industry has developed rapidly, but construction safety remains a core issue in construction projects. Safety accidents frequently occur during the construction process, mostly due to the lack of management. Moreover, prefabricated construction projects require a large amount of human and material resources for assistance, which also leads to potential safety hazards in the construction process<sup>[2]</sup>. Based on this, implementing effective construction project management measures can orderly allocate personnel for work and strictly supervise the construction process, thereby reducing potential safety hazards in the construction stage to ensure the efficient and safe development of related work.

### **2.2. Ensuring construction efficiency and progress**

The prefabricated construction projects cover a huge amount of construction tasks, and often multiple projects are operated simultaneously. If the management of construction projects is not in place, it is very easy to cause coordination problems between the construction personnel and the project department. For example, there may be a situation where some construction personnel have an excessive workload and are under great pressure, while others have an easy workload and less pressure. This will not only arouse dissatisfaction among the personnel at the construction site, but also lead to low construction efficiency due to the imbalance in personnel allocation. Therefore, by exploring the key points and control measures of project management, fairness in work distribution can be ensured, and different tasks can also be effectively coordinated. This can ensure the project quality while ensuring the project efficiency and overall progress<sup>[3-5]</sup>.

### **2.3. Significantly enhancing enterprises' core competitiveness**

For prefabricated construction engineering enterprises, strengthening construction project management, on the one hand, can guarantee the construction site safety and prevent construction workers from getting injured due to improper operations and other accidents. It can not only maintain the business reputation of the enterprise but also avoid all kinds of disputes. On the other hand, it can ensure the construction quality and efficiency of construction projects, thereby enhancing the core competitiveness of the enterprise in the construction market and attracting more customers and businesses. This can ensure the effective operation and long-term development of the enterprise.

## **3. Internal influencing factors of prefabricated building engineering in the new era**

### **3.1. Influence of prefabricated components**

During the application process, prefabricated components are an important prerequisite and determining factor for engineering operations. Therefore, their quality is also related to the progress and quality of the project. In fact, the production of prefabricated components covers many links, such as material selection and mold design, and the interlocking of each link can ensure their quality. Focusing on the development of prefabricated building projects, the influencing factors of their quality can be analyzed from the following points: First, in the design stage, as the early stage of the engineering project, its quality will also determine the progress and overall effectiveness of the construction project. At the same time, the designers' ability and the process's rationality also affect the components' quality<sup>[6]</sup>. Secondly, in the component production, the performance of the equipment, the quality of the materials, etc., also require the key attention of the management personnel. If the selection

of production equipment and materials is unreasonable, it is also difficult to ensure the overall quality of the components <sup>[7]</sup>. Finally, in the transportation link, this process will also cause component damage or quality decline to a certain extent.

### **3.2. Overall competence of construction and management personnel**

In fact, the comprehensive qualities and training qualifications of construction workers and management personnel all affect the progress, quality and cost control of the project to a certain extent. Especially in assembly, whether technicians can operate equipment and connections accurately is directly related to the safety and quality of the project. Therefore, to ensure the project progress and quality within the prescribed time, it is necessary to focus on improving the comprehensive ability of relevant construction workers and management personnel, to avoid work deviations <sup>[8]</sup>.

### **3.3. Influence of onsite management factors**

The effective progress of related engineering projects is closely related to the participation of multiple parties such as design units and prefabricated component manufacturers. If there are deficiencies in the on-site construction management and coordination, it may lead to problems such as project delay and cost increase. Not only that, the on-site operation environment is complex and changeable, with different influencing factors intertwined, which also significantly increases the difficulty of on-site management. Managers need to identify the key influencing factors of quality control, such as the completeness of the quality management system and the timeliness of handling quality issues, and optimize and improve them in combination with the actual situation of the project, providing practical and feasible guidance and suggestions for on-site management to ensure that all installation operations can proceed steadily according to the established process.

### **3.4. Engineering cost control**

The effectiveness of project cost control is a key link in construction. To a large extent, it determines the overall benefit of the project and is closely related to the development of enterprises and even the entire industry, which also highlights the key position of cost control <sup>[9]</sup>. As one of the core links of prefabricated building project management, the scientific nature of cost control is directly related to the return on investment of the project, involving multiple aspects such as the accuracy of cost budgeting, the effectiveness of cost control measures, and the standardization of cost accounting.

## **4. Management control points and control strategies for prefabricated building engineering**

### **4.1. Enhancing the competence and literacy of construction personnel based on reality**

The implementation of prefabricated construction projects is guided by management personnel and assisted by construction workers. Therefore, the overall ability and quality of the personnel are related to the project quality and progress. This requires relevant units to focus on improving the ability of relevant personnel, enabling them to have strong operational and adaptive capabilities, to ensure the effective implementation of the project construction. First, relevant enterprises and institutions need to formulate new plans, focusing on improving the operational capabilities of management personnel and construction workers. Specifically, they can arrange for personnel to go out for training and learning, or invite experts and practitioners in related fields to enter

the enterprise for training to effectively improve the technical level of personnel <sup>[10,11]</sup>. In addition, enterprises can also recruit highly qualified and capable talent to optimize the structure of the construction team, thereby enhancing the overall working ability. Second, the construction unit needs to guide management personnel and construction workers to be aware of the value of their own work, prompt them to establish correct values, and encourage technical personnel to participate in training and learning regularly and study independently, to master the latest engineering concepts and management methods, and thereby ensure the smooth progress of project construction.

#### **4.2. Emphasizing quality management of prefabricated components**

To ensure the quality of prefabricated components, quality control should be strictly carried out from the very beginning, which can ensure the effective implementation of a series of subsequent project construction works. On the one hand, enhance the quality awareness of prefabricated component production enterprises, incorporate the quality concept throughout the entire production process, and strengthen the comprehensive ability of quality management personnel, improve their quality awareness and skills, and ensure that production is carried out in accordance with standards and specifications. On the other hand, increase the quality monitoring during the production process, establish a complete monitoring system, and closely supervise each link to ensure that products meet the standards. At the same time, pay attention to the maintenance of equipment to improve production efficiency and quality. Moreover, strengthen the inspection before the prefabricated components leave the factory, strictly check the appearance, size, concrete strength, etc. of each batch of products, and timely rectify or scrap the unqualified products to ensure the quality of products leaving the factory. In addition, implement safety supervision for the transportation and storage of components, comprehensively consider transportation requirements and storage conditions, reasonably plan transportation routes, and arrange experienced teams to be responsible for transportation to ensure that the components are safely delivered to the designated area <sup>[12]</sup>. Specifically, management systems can be designed, such as presetting transportation plans and preparing prefabricated components well, which can improve the quality of components.

#### **4.3. Accelerating informatization construction in engineering management**

Since the entry into the new era, the rapid development of big data, the Internet of Things, etc. has provided brand-new ideas for the implementation of prefabricated engineering projects. Therefore, promoting the informatization construction of management work is of great value, which can not only enhance management efficiency but also optimize management quality. First, enterprises can empower construction project management with cutting-edge information technologies such as blockchain, 5G intelligent management systems, and big data. For example, with the support of AI and big data technologies, enterprises can quickly integrate and analyze construction project cost data with their help, and accurately grasp the cost situation. At the same time, creating an exclusive construction project management system is conducive to integrating various management resources and optimizing the management process, thereby improving the efficiency of construction project management. Second, talents are the key to informatization construction. Prefabricated construction engineering enterprises should be committed to building an informatization talent team. On the one hand, they can recruit compound talents who have both informatization literacy and proficiency in professional knowledge of construction project management through recruitment channels; on the other hand, for on-the-job construction project management staff, they should regularly organize training on the theme of “informatization construction” to gradually enhance their informatization literacy and enable them to better adapt to the needs of informatization



management. Third, special operation and informatization operation specialists can be set up. Enterprises should arrange professional personnel to be responsible for this work, deal with the faults and problems occurring in the system promptly, ensure the stability of the information-based construction project management system, provide continuous and reliable information support for construction project management, and help enterprises develop efficiently<sup>[13,14]</sup>.

#### **4.4. Strengthening onsite management and coordination**

To enhance the management and coordination efficiency at the construction site of prefabricated buildings, it is necessary to be based on reality and establish a complete project management framework, gradually defining the responsibilities and authority scopes of each participant. Not only that, but an efficient communication and coordination mechanism should also be established to ensure the smooth and unobstructed information exchange among all parties. With the help of the supervision unit, the installation process of prefabricated components at the construction site should be supervised and controlled throughout the whole process to ensure that the construction quality precisely meets the design standards and regulatory requirements. If quality problems are encountered in the supervision link, targeted rectification opinions need to be put forward immediately, and the construction unit should be urged to implement the rectification measures promptly<sup>[15]</sup>. In addition, communication and collaboration with stakeholders such as suppliers and manufacturers should also be strengthened to ensure that the production and supply rhythm of prefabricated components closely aligns with the construction progress and quality requirements. At the construction site, safety management and environmental protection measures cannot be ignored, and at the same time, the acceptance check of the installation quality of prefabricated components should be carried out strictly to facilitate the orderly advancement of the installation operation activities and comprehensively ensure the efficient and high-quality development of the prefabricated building project.

#### **4.5. Continuously optimizing engineering management processes**

Further optimizing the engineering management process is an important measure to improve the engineering quality and reduce costs, and it can also give full play to the application value of new construction technologies. In view of the complexity and comprehensiveness of prefabricated engineering management, which covers the entire process from design, production, construction to acceptance, managers need to pay special attention to improving the management mechanism and optimizing the process. At the initial stage, the relevant staff should clearly set the goal based on improving the engineering quality and efficiency and reducing costs as the starting point, and then deeply analyze the existing management process, explore the problems and bottlenecks, and then formulate solutions. When analyzing the process, it is necessary to comprehensively consider the interrelationships and influences of each link. For example, the quality of the design of prefabricated components directly affects the production efficiency and product quality, the production efficiency directly affects the construction progress and cost, and the construction quality is related to the final acceptance result.

Therefore, optimization should be carried out from the overall perspective to avoid focusing only on a single link. For example, the following ideas can be designed: It is necessary to be based on reality, introduce new concepts and technologies, improve the accuracy and efficiency of design, and reduce unnecessary modifications and rework; select suitable design software to enhance design efficiency and quality; optimize the design process to ensure the rationality and feasibility of the design; actively introduce new equipment and technologies, improve the production process, increase production efficiency, and effectively reduce production costs; further

simplify the acceptance process, improve acceptance efficiency, reduce disputes caused by acceptance issues, and ensure the smooth delivery of the project. With the help of relevant optimization measures, continuously improving the management process of prefabricated engineering can promote the high-quality, high-efficiency, and low-cost development of prefabricated construction projects, lay a solid foundation for the development of the industry, help enterprises enhance their competitiveness, and enable them to gain a foothold in the market competition.

#### **4.6. Emphasizing the application of BIM technology**

BIM technology is an information inheritance technology model. In the actual application process, it can essentially change the previous working method of project construction relying on drawings, thereby significantly improving the project quality and efficiency while ensuring the project progress. At the same time, it can also effectively reduce project risks. Its application in prefabricated engineering construction can further enhance the overall quality and effect. For example, in the traditional final acceptance link, enterprise acceptance personnel conduct detailed surveys on the site based on construction drawings and related quantity calculations, and judge the project acceptance standards after calculating the collected information on the site. This working form is rather complex, involving a large amount of human and material costs, and due to manual collection, there may be errors in the detection data, affecting the authenticity of the acceptance work. However, BIM technology can effectively improve the efficiency and quality of the acceptance work. In the acceptance work, acceptance personnel can fully reflect the quality of each detail through the application of this technology and comprehensively express the specific construction effect. In the on-site information collection, with the help of computer equipment for collection and comparison, not only can the time and cost of manual calculation be saved, promoting the increase of economic benefits, but also the accuracy of data information can be ensured, and the error rate can be effectively reduced through a large amount of collection and repeated calculations.

### **5. Conclusion**

To sum up, the management of prefabricated building projects can be regarded as a complex, systematic project, which covers several key links such as design, production, construction, and quality control. In the context of the new era, an in-depth study of various factors affecting the management of prefabricated building projects can accurately identify possible restrictive factors and accordingly formulate corresponding control strategies to lay a solid foundation for the smooth progress of prefabricated building projects. At the practical operation level, it is necessary to closely rely on the unique characteristics and actual situation of specific projects to flexibly apply control measures, so as to achieve efficient operation of the management of prefabricated building projects, fully guarantee the high-quality completion of the project, and promote the steady progress of the prefabricated building industry.

### **Disclosure statement**

The author declares no conflict of interest.

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