

# Construction Process Management of Prefabricated Building Based on BIM and RFID Technology

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**Abstract.** With the continuous development of science and technology, the development and application of BIM technology and RFID technology in the production process of industrial manufacturing industry in China, the construction industry is developing more and more rapidly, and the building energy consumption of the whole construction industry is also relatively high. Therefore, in the actual construction and production, it is easy to produce certain damage and influence to the ecological environment. In view of this situation, it is necessary to apply BIM technology and RFID technology to improve the management quality and work efficiency in the practical construction of prefabricated buildings.

## Introduction

Under the current situation, the construction engineering is of great significance to the construction and development of the city. During the construction process of the building engineering, the construction technology and management mode are constantly progressing and developing. How to manage the construction project more scientifically and efficiently is an important problem affecting the construction quality. The author analyzes the application principle of BIM technology and RFID technology. In this paper, the advantages and disadvantages of prefabricated building in construction are expounded, and the problems existing in the quality management of prefabricated building construction are analyzed, and the construction process management of prefabricated building based on BIM and RFID technology is analyzed in detail.

## Application principle of BIM technology and RFID technology

**Implementation Principle of BIM Technology.** The so-called BIM technology is the abbreviation of the building information model. The application principle in the actual construction engineering is to take the relevant data and information in the construction and management of the building engineering as the foundation of building the information model, and construct the corresponding building model. Then with the help of the corresponding digital information technology, the corresponding information and data contained in the construction and management of the construction project are collected and processed, so as to promote the effect of construction management [1]. In general, the application of BIM technology includes the following features: First, the building information data is taken as a certain basic element, then combined into the corresponding information data set to form a database, in the whole database to achieve the unity and management of the data and then to achieve the effect of a high degree of unity and overall sharing. Second, BIM technology is the combination of basic information, graphic information and various forms of information and data of building components, and forms a rich data set, combining with the transformation of information models to achieve the effect of dynamic information transformation. Through the optimization and updating of the corresponding data and information, the whole data and information can be automatically generated into the corresponding documents and pictures, which will play a certain role in the construction process.

**The Implementation Principle of RFID Technology.** RFID technology is a kind of radio frequency technology, which is widely used in people daily life and work. Generally speaking, the application of RFID technology requires only mechanical target setting and accurate identification

of radio waves to effectively grasp the relevant information data contained in the system, and does not need to make the corresponding target determination and tracking for the system. RFID technology often consists of the following components, including transponder, reader, middleware, information software and other related components. In the application of RFID technology, the following features are often included: The first is to achieve the acquisition of non-contact information, which will not be interfered by the corresponding occlusion, has a strong penetration, and can effectively achieve ultra-long distance accurate communication. Secondly, the information contained in multiple tags can be obtained by using this technique, which can improve the efficiency of information acquisition. In the process of practical application, RFID technology can be used repeatedly and has super anti-pollution ability and strong endurance.

### **Advantages and Disadvantages of Prefabricated Buildings in Construction**

With the continuous development of social economy and the rapid improvement of science and technology, in the process of actual construction technology development, the traditional building construction technology has been unable to meet the changing needs of modern architecture. The constantly changing and developing building technology has better requirements for the architectural form of modern buildings. Since the beginning of the new century, more and more new forms of architecture, such as prefabricated buildings, have been used in modern buildings, which are prefabricated in advance outside of their architectural works. And in the actual construction process, it can effectively reduce the construction period, improve the construction progress, and effectively improve the economic and social benefits of the construction. This kind of prefabricated construction engineering can also reduce and reduce the operation cost and manpower and material investment of enterprises in the practical construction engineering application, and is more and more applied and promoted by modern construction enterprises. However, even this new architectural model has some advantages and disadvantages [2]. The advantage of prefabricated architecture is that it can meet the construction requirements and standards of green buildings, and is greatly in line with the new era of the broad masses of the people on energy conservation and environmental protection requirements. In addition, the application of prefabricated architecture can effectively solve the problems of wall cracks and leakage in the traditional sense of building engineering, and effectively improve the overall security and durability of the whole building. But the assembled building often has the disadvantage that, in the actual construction, the part of the manufacturer can not finish the corresponding prefabricated component according to the production cycle agreed by the building unit in advance, and the overall construction progress of the construction project is affected, resulting in delays in the construction of the building.

### **Problems in Construction Quality Management of Prefabricated Buildings**

**Deficiencies in the Production and Application of Structural Parts.** In the actual production and application of prefabricated building engineering, due to the corresponding construction technology and production technical problems, the quality of prefabricated components is often not up to standard. In the actual application process, that the inspection technology and maintenance work are not up to standard, will affect the application and operation of the whole prefabricated component. In the process of prefabricated component stacking, some construction units often have some non-standard operation, which is not conducive to the maintenance and management of the whole prefabricated member, and damages the quality of the component, and will also bring certain threat to the construction quality of prefabricated construction project.

**Inadequate Preparation for Construction.** The construction mode of prefabricated building has a short development time in our country, some construction units do not know the application technology of prefabricated building construction, so it is difficult to master the scientific and reasonable construction application mode. Because of the lack of certain construction planning for its construction engineering application, it is easy to lead to the lack of construction preparation in the corresponding construction preparation. In some mechanical equipment and the corresponding

material preparation as well as the technical personnel and the management personnel disposition has the insufficiency, that causes the assembly construction project construction preparation work is difficult to satisfy the actual application implementation, which is unfavorable to the improvement of the construction quality of the whole assembly project and affects the construction efficiency [3].

**Human Factor.** The application and implementation of prefabricated building construction is not only affected by the construction machinery and technology, but also by the corresponding construction technicians. If the constructor does not carry out the construction according to certain working procedure and operation rules in the application and implementation of the actual construction technology, especially in some key parts, it will easily lead to the failure of the quality of its components and installations, etc., and has an adverse effect on the construction quality of the whole construction project, and also leads to the corresponding safety accidents.

**There are Many Departments Involved in Construction Projects, and there are some Omissions in Management.** In the construction of prefabricated building projects, the construction units and financial management departments as well as the corresponding government organizations are often involved. If the relevant departments do not have a positive and perfect communication and coordination among the relevant departments in the construction, it is easy to cause the chaos of the corresponding construction procedure, which affects the construction progress, causes the waste of resources and the large increase of funds and so on. Therefore, various departments should strengthen supervision and management to form an effective mechanism of mutual supervision and restriction [4].

### **Construction Process Management of Prefabricated Building based on BIM and RFID Technology**

Generally speaking, prefabricated buildings consist of prefabricated walls, staircases, composite floors and other prefabricated components. The whole prefabricated building is made up of many components in the actual construction and construction, which is often similar to the manufacturing enterprises in our country. BIM technology is applied in the design, construction and management process of the actual construction industry, it can improve the corresponding technical support and guarantee for the construction of prefabricated construction. The traditional construction of prefabricated construction often contains a large number of components and parts, if only rely on manpower to carry out construction and management, it is difficult to achieve the corresponding management effect. With the help of RFID technology, we can effectively combine the number of components and information data to make efficient processing, and can do a good job of technical support and guarantee for the processing of component information [5].

**Management of Production and Transport Stage.** In the production and transportation stage of prefabricated building engineering, BIM technology can effectively provide the corresponding model data basis for it. With the help of RFID technology, it can more timely and accurately feedback to the actual situation of the construction site, as well as the corresponding construction progress information. Combining with the actual information data processing structure and comparing the corresponding information model, it is more scientific and accurate to check whether the components enter the field or not, and according to the construction situation of the actual construction site, the whole construction plan is adjusted accordingly.

**Management of Component Production Stage.** In the component production stage of prefabricated building engineering, with the help of RFID technology, the assembly component can be implanted into the corresponding BIM technology coding. The coding of this kind of BIM technology includes the corresponding project code and the message of component code, location attribute, number and extension area etc. The coding of this kind of component unit is unique, which can ensure that the information of the component is accurate in the actual construction process, prevent confusion and repeated application during the construction process, and help to improve the working efficiency, and also has certain significance to the project follow-up maintenance and the management. For the corresponding component coding management, RFID technology can be used to effectively consult and manage. Each RFID technology coding has a

certain relationship, and each location attribute contains certain information, which is of great help to the practical construction, application and distribution of the following assembly engineering. In the process of transportation and distribution of prefabricated components, manpower does not need to input the corresponding information, which can ensure that the working efficiency is greatly improved, and the corresponding human factors will not appear to improve the actual working efficiency [6].

**Management of the Entrance of the Component.** When the prefabricated components enter the market, the simulation of the stacking position of the components with the help of BIM technology can ensure that the actual work efficiency is greatly improved, and in the actual transportation and distribution process, With the help of the corresponding BIM technology, the corresponding transportation times and routes can be simulated to ensure the efficient and orderly progress of the construction and transportation of the whole component, and to effectively avoid the problems in the traditional transportation.

**Management of Construction Site.** After the transportation vehicle enters the site, the basic information of the component and the corresponding stacking position can be transferred to the actual BIM technology system with the help of RFID technology, so as to ensure that the actual member placement position is consistent with the construction plan, and ensure that the actual transportation and distribution efficiency can also effectively improve the quality of the whole component. In the process of construction and construction of actual building engineering, the installation of assembly engineering can be effectively guided and updated with the help of BIM technology, and the transportation and hoisting lines of machinery and equipment can be effectively controlled. In the construction site, the storage and hoisting process of prefabricated components can be transferred to the control center in real time, and then the construction planning is analyzed with the help of BIM technology to ensure that the whole component is in a state of information system control from production to hoisting. With the help of the RFID technology reader in the field, the corresponding data can be adopted in real time and efficiently, and the corresponding plan adjustment can be made effectively to provide the corresponding technical and data support for the subsequent management work [7].

**Personnel Management in Construction Process.** At present, the speed of socialist development in our country is speeding up. In the process of actual urban construction, the scale of infrastructure construction is constantly expanding, and the development of construction industry is of great significance to the construction and development of cities. The management effect of the construction industry personnel plays an important role in the construction and construction safety of the engineering project, by means of the BIM technology model, the risk category of each construction stage of the construction project can be marked, and the risk assessment can be carried out on the corresponding process of the whole project construction, and a corresponding treatment solution strategy can be produced according to the actual engineering construction case. With the help of RFID technology, the concrete data and information of construction monitoring can be collected in time and efficiently, and the working efficiency can be effectively improved and manpower can be liberated. Automatic generation of accurate safety assessment report based on BIM technology can effectively avoid the risks in construction and improve work efficiency.

## Conclusion

In the new situation, construction engineering is of great significance to the construction and development of the urbanization, and in the course of the construction of the construction, with the progress and the development of the construction technology and the management mode, the construction of the construction project management in a more scientific and efficient way is an important problem that influences the construction quality of the construction project. The application of BIM technology and D-RFID technology can effectively improve the management quality and work efficiency. Combined with the application principle of the two technologies, in view of the problems existing in the construction quality management of prefabricated buildings are pointed out, the defects in the production and application of structural parts, inadequate construction

preparation and related human factors, personnel management should be actively done well in the component production and transportation stage, entry and construction site and construction process to continuously improve the quality of the construction process management of the whole assembly building.

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