Application of BIM technology in the design of prefabricated architecture

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Abstract. With the continuous development of modern construction industry, China has moved from the former coarse and open architecture to the field of sustainable development. BIM technology is the primary means of the development of the construction industry. It can play a vital role in prefabricated architecture. As an efficiency tool, BIM technology can provide high synergy efficiency, accurate design experience and low error rate for prefabricated buildings. With the development of construction industry, BIM technology has very important research value in the deepening design of prefabricated architecture. This paper analyzes and understands the specific contents of BIM technology and prefabricated architecture, and explores the application of BIM technology in assembly. Because of the significance value of matching architecture, many people realize that BIM technology plays a very important role in the field of national construction industry.

1. Introduction

With the attention of our country to the construction industry, the prefabricated architectural design has become the development trend of the future construction industry. How to make the prefabricated architecture widely used is the most important goal of our common struggle. As a new trend in the construction industry, prefabricated architecture is not affected by the outside world. It can greatly reduce the reliability of architectural design and improve the accuracy and quality of architecture. However, the application of BIM technology can promote the digital information analysis of prefabricated buildings, establish a virtual construction model based on information data, and through data analysis, complete the number of modeling in the space of multi-dimensional bodies. And achieve the data indicators of each project. On the way of future development, BIM technology can better promote prefabricated buildings, promote the integration of construction projects, plan the construction site of the whole industry, and provide an efficient communication platform for the industry to share information.

2. BIM Technology and Assembly Architecture

2.1. Overview of BIM technology

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2.1.1. Concept of BIM technology
BIM technology is called "building information model" in our country. It is an application of digital information. It forms carrier through concrete work flow and informationizes construction engineering with the help of software function. BIM most important value of technology is the use of dimension space design, through the combination of time and space, the construction of multi-dimensional building model, for the construction engineering industry designers to provide efficient data efficiency tools. The construction engineering personnel can understand the comprehensive project data information through multi-dimensional information, carry out and plan the project, share the information transmission process comprehensively, improve the efficiency of the whole project and shorten the construction period Effect time, greatly reduce the cost. The flow chart of BIM technology modeling is made to understand BIM technology, as shown in figure 1.

Figure 1. Flow chart of BIM technology modeling

2.1.2. Development of BIM technology
In this digital age, science and technology continue to develop, information technology is leading the field. In all aspects of our life, the development of science and technology has greatly improved people's quality of life and efficiency. BIM technology as the primary breakthrough in the construction industry. What it brings is a new expression of the whole construction industry. In the traditional construction industry, the loss and transmission of information is not smooth, resulting in the development of the construction industry and the emergence of BIM technology. Solve the lack of construction industry workflow and thinking, accelerate the transformation of the construction industry, BIM technology is dependent on three-dimensional digital Information technology solves all the information transmission of management, integration and application construction projects[1]. The whole process of communication, coordination and construction optimization is realized fundamentally, and the production efficiency of the whole construction industry is greatly improved. Among the development of construction enterprises in our country, BIM technology is not only the analysis software of information data, but also the internal management tool of construction enterprises. It can effectively help enterprises to bid and manage projects. Greatly improve the resource allocation ability, reduce the level of enterprise management, make the interior more transparent, simple and intuitive, thus improve the production efficiency and realize the intelligent industrialization of construction in China. Development of BIM technology is the inevitable choice for the sustainable development of the whole construction industry.

2.2. Overview of prefabricated buildings
2.2.1. The Concept of Assembly Architecture
Assembly building in the construction industry is called a new type of building industrialization, refers to the industrial prefabricated production components in the implementation of equipment building. In the traditional construction, the site pouring needs to carry the building through all the building materials, and the prefabricated building is to bring the scheduled materials to the site for assembly organization.
During the development of the construction industry, the construction industry has been industrialized by prefabricated buildings, the main performance of which is prefabricated wood structure, rigid structure and PC building. In the construction structure, the prefabricated building needs to be deeply understood before the construction of the project. Through many aspects of discussion, the component is deepened to form a standardized design, and then the construction is carried out synchronously through unified production, assembly and pouring shortens the time limit and reduces the cost.

2.2.2. Types of prefabricated buildings

- Block building: The way of prefabricated building is to carry on block wall through prefabricated material, usually the building is built by 3-5 stories. If we want to strengthen the hardness of the wall, we need to carry on multi-story superimposed block building to achieve the required hardness[4].
- Sheet building: Plate building, as the most important type of prefabricated building in industrial system architecture, is composed of large exterior wall panels, plate and roof board. Nowadays, the use of plate architecture is also very extensive.
- Boxed buildings: The most important development of box building is extended by plate building. It has a deep degree of industrialization to the whole building and can be installed quickly. The box part is generally completed in the factory, and even the interior decoration of the box is all installed. As long as the connection can be used directly.
- Skeleton sheet building: The skeleton plate building is composed of skeleton and plate, which is composed of many kinds of structure in general form. The first is the structural frame system, which is composed of column beam, and then by shelving plate and non-heavy exterior wall[5].
- Floor-rise Building: It belongs to a kind of plate column structure system. The method it implements is different from the conventional method, often in the bottom concrete above the repeated pouring floor and panel, for installation design column weight and height for reinforcement. Nowadays, in the construction of the lifting board, its ground operation is large, which can greatly reduce the danger of high altitude operation transportation, save the formwork and scaffold, and greatly reduce the area of the construction site.

3. Application of BIM Technology in Deepening Design of Assembly Architecture

3.1. Application of Deepening Design

In the deepening design of buildings, the accuracy of installation and the effect of decoration process are directly affected by the design of prefabricated components. In the traditional design of prefabricated components, the outline design and layout of buildings and the setting of burying parts are constructed by craftsmen. And when the BIM technology is quoted, the construction and design of the construction industry can be greatly improved, so that the prefabricated construction can be generated in multi-dimensional body, and the design can be the design Accuracy and time of design cycle[7].

3.2. Application of Complex Point Processing

In the process of prefabricated building structure, the characteristics of prefabricated components and field splicing must be satisfied in order to ensure that the structure of the building has sufficient integrity and seismic resistance. In the past buildings, the connection points of wall limbs and prefabricated components are often prone to dense interlacing, which leads to the inability of steel bars to be bound or to solidify buildings in the process of binding. By using the BIM technical structure, the designer can use the multidimensional body model to realize the realistic layout process, refine the collision inspection to the grade of the steel bar, accurately optimize the layout and simulate the construction, and avoid the collision of the construction process and the unreasonable operation sequence, Ensure that the whole project can be carried out properly to get the plan.
3.3. Application of collision detection

Collision detection plays a very important role in the application of prefabricated buildings. Collision detection is often used in conventional buildings, such as collision detection in pipeline synthesis, prediction of pre-buried collision points between prefabricated components and internal steel bars during contour collision, and collision inspection. Compared with the traditional construction industry design, the integration of BIM technology has a powerful detection, the search function can quickly generate collision reports, and can be modified many times. After collision detection, the BIM can also be installed by simulation. And self-repair.

3.4. Application of Site Layout Management

In the construction process of prefabricated buildings, it is necessary to arrange the site. In order to meet the daily installation schedule, the equipment building needs to be stacked in a large area of nuclear load. So the stacking position plays a very important role in the implementation of the project. Considering the problems of vehicle transportation planning, avoiding reducing the secondary transportation during construction and ensuring the smooth operation environment, the design planning is very important to the layout process. BIM the integration of technology, the problems of traditional management can be solved effectively, and the reasonable simulation and calculation of the site can be carried out reasonably, and the lines and functions of the site layout can be planned Line optimization.

4. Conclusion

According to this research and analysis, we can understand that BIM technology plays a very important role in the further design and application of prefabricated buildings. It can form the industrial chain of the construction industry and manage the information resources. In a sense, he has greatly improved the project design and management system of the whole construction industry, which ensures the project operation cost. In the future, BIM technology can form digital industry, provide strong data analysis and sharing ability for the industry, support multi-aspect coordination ability, let big data Internet cooperate BIM transform the industry upgrade of construction industry.

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