

Research on the Application of BIM 3D Data Model Technology in the Field of Construction Equipment Installation Engineering

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Abstract

At present, the types of buildings are increasing, and people have higher requirements for the function, quality, and appearance of buildings. In order to fundamentally improve building functions and meet people's demand for building use and quality requirements, the installation quality of construction equipment must be ensured. The application of BIM technology to the field of construction equipment installation engineering has positive significance for improving the overall installation and construction level. The article gives a brief overview of BIM technology and discusses its specific application in construction equipment installation engineering.

Keywords

Improve Building Functions; BIM Technology; Specific Application.

1. Introduction

At present, the types of buildings are increasing, and people have higher requirements for the function, quality, and appearance of buildings. In order to fundamentally improve building functions and meet people's demand for building use and quality requirements, the installation quality of construction equipment must be ensured. The application of BIM technology to the field of construction equipment installation engineering has positive significance for improving the overall installation and construction level.

2. Overview of BIM Technology

As a three-dimensional data model, BIM can be used in various stages of construction to help users access relevant information at any time. At the same time, with the help of the BIM model, resources are shared and the efficiency of each link is improved. As an information model technology, BIM technology can be applied to specific engineering design to reflect the characteristics of its corresponding elements and realize information sharing. It can also lay the foundation for collaborative work between the various entities. In the design of construction equipment installation engineering, BIM technology can fully reflect the characteristics of building elements and the relationship between the elements, reduce the mutual interference between various processes, and meet the needs of construction quality, construction period and safety [1].

3. The Specific Application of BIM Technology in Construction Equipment Installation Engineering

3.1. Application in Pipeline Collision Inspection

In the implementation of construction equipment installation projects, there are sometimes cross-contradictions and mutual interference between various disciplines and links. Through the collision inspection, contradictions can be discovered in time, and various contradictions and cross-problems can be prevented. Hard collision, as an important factor affecting the

normal progress of construction, will bring huge losses to the project. With the help of BIM technology, the collision inspection process is simulated, and possible collisions are checked and judged. Based on the simulation results of BIM technology, the pipeline spacing and distribution are reasonably set to optimize the pipeline distribution [2].

3.2. Application in Comprehensive Pipeline Design

As the overall scale of construction projects increases and the scale of construction and installation projects increases, the content involved becomes more complex. In particular, the equipment installation project contains multiple types of equipment and various pipelines, which increase the difficulty of the installation project and make the construction environment more complicated [3]. Only by continuously optimizing the pipeline design can the construction difficulty be reduced, and the use of BIM technology to optimize the pipeline design distribution can ensure the rationality of equipment installation pipeline layout. In the specific implementation, relevant staff are required to carefully investigate the site conditions, and at the same time, combine BIM technology with engineering design drawings to construct simulation renderings of construction equipment installation projects, effectively simulating the scene of the construction site, and completing collision inspections according to the actual requirements of the project, and based on the three-dimensional The model generates a collision inspection report to ensure a more reasonable pipeline layout, further optimize the construction plan, avoid pipeline damage due to construction chaos, reduce project rework problems, and ensure smooth completion [4].

3.3. Application in Data Processing

With the help of BIM technology, effective management of construction equipment installation projects can be implemented not only on the technical level, but also on the economic level. Through the collision detection project, the relevant parameters of the pipeline cutting design can be obtained, and the cutting management of the entire project can be optimized. Starting from the engineering procurement work, the BIM technology virtual equipment installation process is used to effectively control the cutting process and do a good job of project technical disclosure. Earnestly implement the multi-calculation comparison activities, and properly arrange in accordance with the installation project construction plan to ensure the smooth progress of subcontracting settlement. For each construction stage, relevant personnel need to collect relevant data and information carefully, form an information report, and submit the report to the person in charge of the project in order to review and analyze relevant data, and feed relevant data information to the BIM modeling system [5]. Through the BIM technology, with the help of the data information of each link of the installation project construction, the BIM three-dimensional model is constructed, data collection, project file management, etc. can be implemented, and the relevant structural design can be quickly invoked to achieve a rapid response effect.

In the traditional way, designers in construction equipment installation projects mainly use CAD software to compile relevant data, and cannot compare related databases. The probability of calculation errors is relatively high, which easily affects the design effect, and rework will reduce the overall design efficiency. When errors occur in the process of compiling data, designers not only have to change the design drawings, but also need to re-compile the database, which will greatly increase the workload. Part of the engineering design has irreversible characteristics, which requires designers to redesign. With the help of BIM technology, equipment installation engineering designers can use the BIM system database to automate the compilation and statistics of related data, which can significantly improve the accuracy of installation engineering materials and the computing power in design work. Through automatic statistics and compilation of design data, it is also possible to control the cost budget in the engineering design, reduce the overall engineering cost, and save costs.

3.4. Improve Overall Construction Efficiency with BIM Technology

During the construction of equipment installation engineering, the installation engineering should be accurately designed in accordance with the needs of the owner. BIM technology can realize a visual design mode. Because BIM technology is used as a three-dimensional model system, it is very different from previous CAD two-dimensional drawings. In the previous design work of construction equipment installation engineering, two-dimensional CAD construction drawings used lines to construct various construction design information on the drawings, and the designer constitutes a complete installation engineering system, but also needs to use his own spatial imagination ability to in his mind Simulate by yourself. This method has great limitations, not only low work efficiency, but also increase the probability of error. The BIM system has the characteristics of visualization. With the aid of the three-dimensional model, the original two-dimensional line drawing can be mapped to the designer, providing the designer with three-dimensional dynamic graphics, enhancing the visualization of the design process, making the design work more convenient and more efficient high.

For example, in the design of the HVAC installation system, with the help of visual BIM models, all the pipes in charge can be modeled to form an installation model of the HVAC water pipe system; in the layout of the fan room and refrigerating machine room, BIM technology can also be used to deepen the drawings, according to The elevation, size, etc. designed in the drawings, in-depth design modeling content; in the design of the water supply and drainage equipment system, BIM technology can comprehensively consider all the modeling depth, modeling according to the relevant parameters in the drawing [6-7]. The construction equipment installation project also includes a variety of installation links. BIM modeling technology can meet the modeling needs of various disciplines. The data types are rich, including areas, lines, locations, and other content.

3.5. Application in Construction Safety

In the implementation process of construction equipment installation projects, many building materials are included, and the construction environment is complicated, and safety issues in construction must be considered. In specific construction, many mechanical equipment, materials, and tools will be used. Once a safety problem occurs, the consequences will be disastrous. The application of BIM technology in the safety management and control of installation projects can increase the intensity of construction safety management and control. At present, many construction companies pay little attention to safety management and control. Although some construction companies pay attention to safety management, due to their limited capabilities, the safety management methods adopted are relatively backward and cannot meet the safety management needs of modern projects. Using BIM technology to construct a construction and installation engineering model, and to simulate the implementation of the engineering project, it can find possible safety problems, so that effective safety prevention and control measures can be taken to improve the safety of engineering construction.

4. Conclusion

From the above analysis, applying BIM technology to the field of construction equipment installation engineering can establish a three-dimensional model based on relevant data and information, realize design visualization, help with project construction, and improve construction quality and efficiency.

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