

Application of BIM Technology Based on Autodesk Revit in Construction and Installation Engineering

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Abstract: Based on BIM technology, this paper expatiates on the application concept of BIM in the current construction and installation project. Through the application of Autodesk Revit in the construction of building model and the application of integrated design in pipeline, electromechanical and so on, the complex CAD two-dimensional plan into an intuitive Revit three-dimensional space map, to avoid the secondary design caused by pipe collision, shorten the design and construction time, reflecting the Autodesk Revit's BIM technology in the construction and installation engineering design, pre-processing, construction and the figure stage has the potential to reduce the total investment cost of the project, improve the yield and other potential value.

Introduction

With the development of China's construction industry, BIM technology has been widely promoted, BIM simulation installation technology is also applied to the architectural design. Before the start of construction using BIM simulation installation technology, through the deepening of the design drawings, designers use the powerful computer functions to express the original two-dimensional plane drawings that are not fully reflected through the BIM simulation, and then form the installation of three-dimensional simulation images, the construction staff through the BIM simulation of the entire project has a visual understanding. Through the BIM technology in the construction and installation engineering design, pre-processing, construction, drawing the use of stage, access to the accuracy of the design of the installation, design costs are reduced. According to the deepened BIM simulation map construction, reducing the construction costs, reducing the rework rate, shorten the construction period.

Project Overview

The project is a large-scale building integrating the retail, finance, business, catering, residential and cultural leisure. Electromechanical installation system in this project is more numerous, including five major professional projects, electrical engineering, fire professional engineering, ventilation

and air conditioning professional engineering, water supply and drainage engineering, weak system professional projects. In the project construction process using three-dimensional installation space, civil engineering and decoration and other professional coordination is the difficulty of this project. Therefore, the project uses BIM technology to coordinate the pipeline layout, so as to achieve a comprehensive balance design, while the collision check, by generating a three-dimensional renderings virtual reflection of the collision point, and then to the field to check and apply it to the pipe and the common support of the prefabricated processing.

BIM simulation installation technology

BIM simulation installation technology refers to the use of advanced software, the formation of building models in the computer, in a virtual environment, simulation of building drainage, warm, electricity, gas and other professional pipeline and equipment installation, through the pipeline synthesis, in the formal submission construction plans to find out where the pipeline and equipment collision, pre-found in the CAD two-dimensional plan that cannot reflect the problem to adjust. BIM simulation installation technology in the order: First, the building and structural model link, followed by the establishment of link file formation reference map, and finally deepen the design of drainage, HVAC, electrical and other professional.

The specific process of installation technology consists of three parts, one is to use BIM software to complete the CAD two-dimensional drawings into digital information through the formation of digital models. The second is through the BIM class software and then drainage, HVAC, electrical and other professional drawings pipeline and equipment integrated layout processing, through the operation of the collision function to check. Third, the technical staff through the defective place to adjust and modify the modified drawings after the final transformation of the final construction drawings, see Figure 2.

BIM technology in the installation of the application

In the prefabrication process, the 3D stereoscopic model is introduced into the Autodesk Revit software. The three-dimensional model is converted to obtain the engineering design drawings. Based on the drawings, the prefabricated processing is guided and the on-site operation of the pipeline is reduced.

In the installation of the project, the prefabricated parts of the factory processing, in the field installation and construction process, the use of BIM technology derived data, prefabricated processing site measurement work can be greatly reduced, component processing accuracy and speed are valid to improve the original rough and decentralized construction mode into an

integrated and modular model. At the same time, each component of BIM technology is given their own size, model and material name and other parameters. Each component has its own code and parameters, so that the same material can be cut together and processed, the same size of the material can also be mass production, thereby improving material utilization, reduce waste, prefabrication and BIM collaboration flow.

The majors in the pipeline after the collision adjustment are modified to complete the deepening of the drawings, so after review the professionals can be used as the final construction plans. The current construction drawing review standard is two-dimensional, the three-dimensional building model should be transformed into two-dimensional drawings, with the rapid development of the construction industry, a variety of strange architectural shapes and component equipment, the traditional CAD plan has been unable to meet the construction. It is required that the geometric and spatial locations of the heterogeneous component devices can be intuitively reflected by the visual building model of the BIM. By cutting out any position of the building model, Revit's automatic plot command should be used to output the project's two-dimensional plan. As the construction workers are currently accustomed to the use of two-dimensional plan, the technical staff need to send a plan to the construction staff, while the need to deliver three-dimensional drawings, three-dimensional drawings can be pictures and video way to convey to the construction staff to deepen the drawings eventually contain two- 3D drawings.

Benefit analysis of installation works

Through the BIM on the construction and installation of the project simulation, the construction staff can intuitively understand the entire installation process, thus improving the efficiency, but also making the pipeline path that is optimized, thereby reducing the rework to shorten the installation cycle. After BIM simulation deepening, the use of pipeline function is perfect, space layout is reasonable, which save the space occupied by the pipeline. By optimizing the pipeline in the installation process, the construction costs and rework conditions have been reduced. Shenyang City Business Center installation project in the BIM simulation, the collision detection in the pipeline were found in the collision point of 257, according to 800 yuan per collision point of the rework costs, the project can save a total of 205,600 yuan.

Conclusion

Application of Revit three-dimensional software can automatically generate the amount of installation works, while CAD two-dimensional design of cumbersome that is easy to miss the material statistical work will no longer be important. It is feasible to apply Revit software to

Shenyang City Business Center through BIM's simulation of construction and installation. Compared with CAD two-dimensional drawing, Revit software simulation can greatly reduce the workload and improve work efficiency. Revit 3D software can accurately generate the amount of engineering is CAD two-dimensional design is unparalleled. With the gradual promotion of BIM technology, the advantages of BIM technology on the construction and installation process will also be presented, which will improve the level of China's construction and installation projects.

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