Design and Application of Error Correction System for Construction Engineering Design Parameters Based on Bim

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Abstract: Bim Technology Has Been Widely Used in the Construction Engineering Design Since It Can Operate in the Model and Change the Traditional Way of Project Construction and Management Based on the Text Form in the Life Cycle from Project Concept Production to Complete Demolition. However, At Present, There Are Some Errors in the Design Parameters of Construction Engineering, Which Need to Be Improved by a Sound System. Therefore, Based on the Theory of System Error Correction and Bim Design Parameters, This Paper Puts Forward a Specific System Design Scheme, and Finally Verifies It. the Experimental Results Show That the New System Can Effectively Improve the Error Correction Effect of Architectural Design Parameters.

1. Introduction

1.1 Literature Review

In the architectural engineering design, the traditional two-dimensional design method has been difficult to meet the needs of the current social development. In this context, three-dimensional simulation BIM Technology has been widely used in the architectural design industry. And, with the extensive development of social economy, many scholars have launched a detailed discussion on this. Zhang Guohua pointed out that the BIM can provide efficient and accurate technical support for the construction system. In this paper, the author puts forward the optimization process of BIM platform architecture design, and gives the specific experimental process. The results show that the optimization method of BIM Technology Engineering design can effectively provide the work efficiency of the construction industry (Zhang, 2018). Luo Qinglong proposed BIM optimization idea based on Auto CAD software platform to optimize 3D digital design scheme, so as to improve construction efficiency (Luo, 2018). Xu Pingfei and others combined the advantages of BIM to build an engineering information management architecture, and gave a distributed heterogeneous engineering data sharing scheme to meet the needs of diversified construction work. Under the experimental results, the validity of the project is verified (Xu, et al, 2016). Yang Chun pointed out that as a key link in the construction engineering system, the technical safety and operation status of bridge tunnels play an important role in people's life and property safety (Yang, 2018). At present, with the acceleration of urbanization, urban infrastructure construction is going through the transformation stage of building structure guarantee operation (Bao et al, 2017). In this case, the rapid development of the Internet of things technology makes it possible for BIM Technology to manage the construction industry information. At the same time, the design and application of parameter error correction system is of great value in BIM construction engineering design (Gao et al, 2018). However, with the rapid development of BIM Technology, the parameter error correction system needs to be further improved and optimized, and the current research still needs to be improved.

1.2 Purpose of Research

BIM Technology can effectively coordinate the work of each section and quickly change the way of project participation. In this case, there will be some errors in the design parameters of the construction project, which will lead to great changes or accidents in the project. Therefore, it is

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necessary to further optimize the correction system, so as to realize the efficient operation of the work efficiency. Generally speaking, the design parameter error of building engineering has strong preciseness, which needs to be corrected by systematic error correction system. However, there is no in-depth study in the existing research, which makes the related research field in the fault stage. Therefore, it is of great significance to design and optimize the error correction system based on BIM design parameters.

2. Overview of Relevant Theories

2.1 Theoretical Analysis of System Error Correction

Generally speaking, it is difficult to eliminate the influence of measurement results by mathematical statistics. But at the same time, the system error has regularity. According to the actual situation, the system error model can be established by experimental means, and the system error can be reduced after correction. The system error correction includes the nonlinear correction of full-scale drift and zero drift. Digital and analog nonlinear correction are usually used in many practical situations, while analog nonlinear correction automatically changes the characteristics of the amplifier according to the signal, so as to adapt to the measured characteristics. Only with high accuracy and test can microprocessor be used in digital measurement technology, and its powerful calculation and control function can realize system error correction. When the correlation correction system is running, its accuracy will be affected by many conditions, resulting in performance degradation or some unexpected situations. For example, in the manufacturing process of encoder equipment, the introduction of machinery and electronics with defective performance may lead to positioning errors, or electronic noise and environmental conditions may also affect the quality of encoder signal.

2.2 Theoretical Analysis of Bim Design Parameters

The three-dimensional information model generated by BIM can create the data of design conditions from different parameter contents, thus forming an alternative scheme. In this case, the architect and the owner can fully discuss, from the opposition of both sides to the coordination, so that the communication becomes more clear, reducing the chance of modifying or overturning the design scheme. At the same time, the discussion between architects and civil engineers is always at a stage after the construction process, so the discussion process is changing at any time. The drawings of architects and structural engineers may be right, but there will be some problems after putting them together. With the help of BIM Technology, the parameter design of architects and civil engineers will have certain basis. By using the same language and concept, they can achieve good communication effect, thus reducing the conflict between design content. In addition, the elevation, plan, and structural drawings of traditional buildings will exist in different files, and various resources need to be used when modifying, which may have small errors. In this case, several correction experiments are needed to ensure the correctness of the drawing. At this time, if the building information model is used, all the information will be put together, so that all the information will be automatically corrected, eliminating the communication and correction time, so as to reduce the possibility of errors or omissions.

In the design of Construction Engineering with BIM Technology, the supervision unit can use mobile terminal equipment to compare whether the construction engineering is constructed according to the drawings. In case of any incompatibility, the mobile device will automatically detect and transfer the information to the BIM integration interface, and the engineer will check whether the safety of the building is affected. From the traditional way, if you want to inquire whether there is any error in the architectural design, you need to ask the relevant personnel and structural engineers, and then discuss whether it needs to be modified. When the building needs to be modified, it also needs to communicate with the architect, and the process is quite trivial. In error correction, BIM Technology is required to constantly adjust the accuracy by using relevant equipment. When the system returns to a specific location measurement range, a measurement

location will be close to the measurement value. Assuming BIM Technology can set a straight-line stage to a specific position, when the movement is completed, the measuring equipment will move to the actual position. When these commands are repeated, it is possible to detect whether an error has occurred. Therefore, it is necessary to test a series of points in linear motion.

3. Design and Application of Error Correction System for Design Parameters of Building Engineering under Bim

3.1 System Design Process

BIM has been widely used in the field of domestic architecture, but it still needs to be further optimized in the design of error correction system of architectural engineering design parameters. It is necessary to solve the problem of single method and reduce the input cost of human and material resources. Therefore, this paper provides an efficient error correction system of architectural design parameters, which is used to achieve a good connection of multiple pictures and operation and maintenance information of architectural design. In this case, the following process is needed, as shown in Figure 1.

Step 1: Building the error correction model of BIM design building engineering parameters, using the model of operation and maintenance stage, and correspond the content of construction site to the model used.

Step 2: Coding the components in the design parameter error correction model according to the actual needs, so as to form the system of reference components and create different types of codes.

Step3: The disordered coding corresponding to management equipment and accessories is mapped to the error correction system of design parameters of building engineering, so as to form the second coding under different types and different equipment, and it is applied to the corresponding equipment or accessories in CAD drawings.

Step 4: The model built by lightweight processing stores the lightweight data in the database of operation and maintenance management platform.

Step 5: Importing the electronic file into the platform database as the data content of the error correction system.

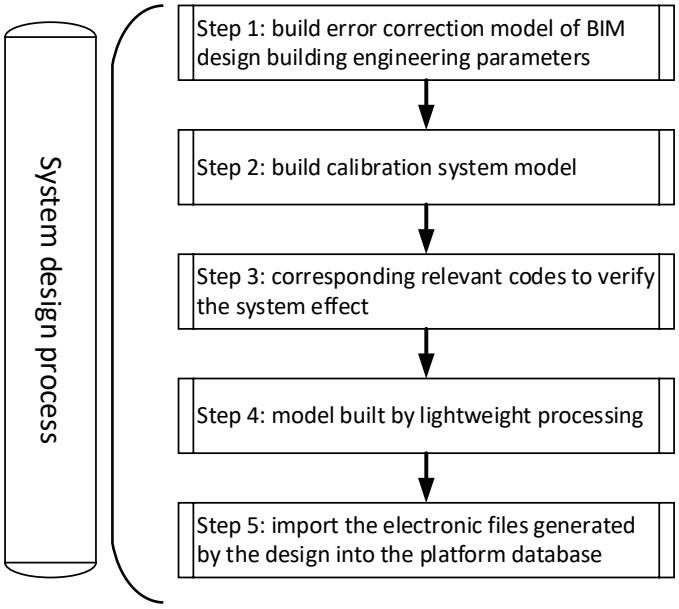

Fig.1 Specific Process

3.2 System Application

In order to verify the performance of the engineering design parameter error correction system, the system needs to be further elaborated. The following implementation contents have no conflict in the implementation process, i.e. they can be combined with each other, which has a good guiding

effect on the error correction of architectural engineering design parameters under BIM Technology.

First, set the error value. The horizontal and vertical errors of the pipeline shall not exceed 0.5m and 1m respectively. The horizontal and vertical errors of the equipment, important valves and pipeline accessories shall not exceed 0.5m. The BIM model is largely limited to the comprehensive pipeline layout, and needs to unify the system name and pipeline accessory type standards. Therefore, it is necessary to unify the ownership and system name of each system to make the parameter error correction model system clear. Further compare the key parts, key equipment and key accessories, record the error between the model and the actual parameters, and keep the color of the system model consistent with the field.

Second, use the Revit plug-in to manage the devices and accessories one by one. In this case, the random code generated by the system can be extracted and attached to the identification equipment and accessories. There may be many similar devices in the building, and it is difficult to distinguish the devices only using the first coding level. Therefore, in response to the requirements of later management, you can use the Revit plug-in to manage individual components. At the same time, we can use the third-party software to store BIM model data in the database and upload it to the data repository online. In addition, connect to a third-party software system, so that it provides classified content.

Third, when using BIM Technology for construction, electronic files can be imported into the operation and maintenance management system, and the first code and the second code can be used as the identification target for optimization. When the architect and the engineer calibrate the parameter error, they can click a component to view the relevant data. The format is not limited to the original data and relevant scanned copies.

4. Conclusion

Under reasonable conditions, this research system uses BIM Technology to carry out the error correction experiment of architectural engineering design parameters. The research results show that the research effect is good and the expected effect is achieved, which can provide some reference for practical application.

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