

Database Establishment and Application in Engineering in Underground Karst Engineering Based on Bim Technology

Tang Wei

Guiyang University, Guiyang, Guizhou, China

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Abstract: with the Maturity of Bim Technology, It is Widely Used in the Construction Industry. the Construction of Underground Karst Engineering is Very Difficult, Bim Technology Can Be Applied. under the Background of Information Technology in the Construction Industry, Bim Technology Can Realize the Design, Detection, Information Exchange and Other Work in the Construction through Digital Scanning, and Also Can Establish the Engineering Database. Based on This, This Paper Studies the Value of Bim Technology in Underground Karst Engineering, and Explores the Application of Bim Technology in the Establishment of Underground Karst Engineering Database. It is Expected That There is Data Information to Be Relied on in the Construction of Underground Karst Engineering, So as to Improve the Management Level of Engineering Construction.

1. Introduction

1.1 Literature Review

He Tao and others believed in 2017 that with the development of social economy, BIM technology has been further applied in the project, and its role in the construction of some karst projects has become increasingly obvious. BIM mainly uses the database and three-dimensional model in the process of engineering investigation, and uses other software to establish the network, power grid and other models in the engineering construction, so as to better serve the engineering management (he et al, 2017). In 2017, Yang Liu believed that the application of BIM technology in engineering management can effectively improve the engineering efficiency. By analyzing the application of BIM technology in China and studying its application in project cost management, the accuracy and preciseness of project cost calculation can be effectively improved (Yang, 2017). In 2018, Xing min believed that in the process of subway construction, using BIM technology to establish document database can speed up the modeling efficiency and progress in the process of subway construction. Through the establishment of these databases, the virtual construction excavation is established in the construction process, and a new subway construction scheme is explored. Good results have been achieved in the specific subway construction process (Xing, 2018). Xu Demin and others believed in 2017 that BIM technology has been widely used in construction projects since the new era. BIM is also widely used in some karst engineering, but there are few related research literatures. They use BIM technology to collect the original data in the project and build a digital model. Based on this, a more intuitive solution to reflect the scale and location distribution of karst caves in karst engineering is proposed, and a case study is provided for related projects (Xu and Chen, 2017). Han Yujie and others believed in 2018 that BIM is a new information technology emerging in recent years and applied in engineering, providing technical support for further development of the construction field. Aiming at the problem of vulnerability detection in engineering construction, the establishment of BIM database can realize the whole process information detection (Han et al, 2018). Qin Xian'an and others believed in 2017 that with the development of China's social economy, construction land is becoming less and less. Many buildings will choose to be built in karst, local rock and other adverse terrain conditions. Therefore, through the research on the problems of excavation and pile injection in karst areas, the application

of BIM can provide technical support for such projects, as well as reference and reference for similar projects (Qin and Wang, 2017).

1.2 Purpose of Research

At present, China's social and economic development is at a high speed, and infrastructure construction has laid the foundation for economic development. BIM technology is more and more widely used in engineering. However, the favorable terrain in many areas has been used up, and many buildings can only be constructed in the karst area. In the process of construction, there are many technical problems. If BIM technology can be used in engineering construction in karst area, it can effectively improve the efficiency of the project. In view of this, this paper studies and uses BIM technology to accumulate the original data and establish the data model of karst, so as to help establish the information database in the construction of karst engineering. In this paper, the karst cave distribution in the terrain and the application of BIM technology in the construction process are introduced in detail. It provides feasible technical means and case reference for the construction and promotion of construction engineering in karst area in the future. To provide different technical means for China's engineering construction, and make the engineering construction smoothly under different terrain conditions and environments.

2. Application Value of Bim Technology in Underground Karst Engineering

In the design stage of underground karst engineering project, BIM technology is used to transform two-dimensional plane design into three-dimensional design. This design model is more intuitive in the specific construction. Using BIM technology to analyze the data of the basic knowledge base can make the project more detailed in the design stage. It can also use the three-dimensional model established by BIM technology to analyze, so as to improve the accuracy and efficiency of the design phase, so that the owner can be satisfied. In addition, it will have a significant impact on the working efficiency of the construction unit and the working mode of the design institute. In BIM technology, there is also a three-dimensional laser scanning technology, which can be used in underground karst engineering. This technology can play an important role in earthwork calculation, complex modeling of building exterior wall, installation of curtain wall and arrangement of some construction data. In addition, BIM technology can also provide technical support for the fine operation and accurate construction of some construction projects.

In the construction process of some underground karst projects, BIM technology can improve the management mode. The construction personnel can use the model established by BIM technology to carry out virtual construction in the computer. In the process of virtual construction, find out the possible problems, and provide reference for the actual construction. This method can also provide reference for decision-makers in the process of making construction policy, avoid major errors in the actual construction, and to some extent, improve the construction efficiency of the project. Using the original construction data and some supervision verification materials can help the construction company to use BIM to input data integrity. In order to improve the information level of the whole underground karst engineering industry, and constantly promote the management of construction projects more refined.

3. Establishment of Database in Underground Karst Engineering Based on Bim Technology

The database of underground karst engineering established by BIM technology is the concrete data formed by the three-dimensional model of computer. This database not only contains some important information in the project, but also is an important guide for the construction. These data are not immutable, but change with the construction progress. This requires that the database should be adjusted and changed at any time to reflect the real-time data in construction timely and accurately. So as to speed up the construction progress, improve the quality, reduce the construction cost and increase the actual profit of the project. And 3D laser scanning can also provide supplementary support for the database. However, this data processing method and the model made

by BIM technology need to be further improved in docking. In addition, based on BIM technology, and the use of software, technology and other means, for the establishment of database platform to improve. In order to provide reliable data support for underground karst engineering projects in the design stage, construction stage and later operation and maintenance stage. It is also helpful for the fine management of underground karst engineering in different construction links, and it is also a new technical mode in engineering construction. The specific mode of engineering construction database established by BIM technology is shown in figure 1.

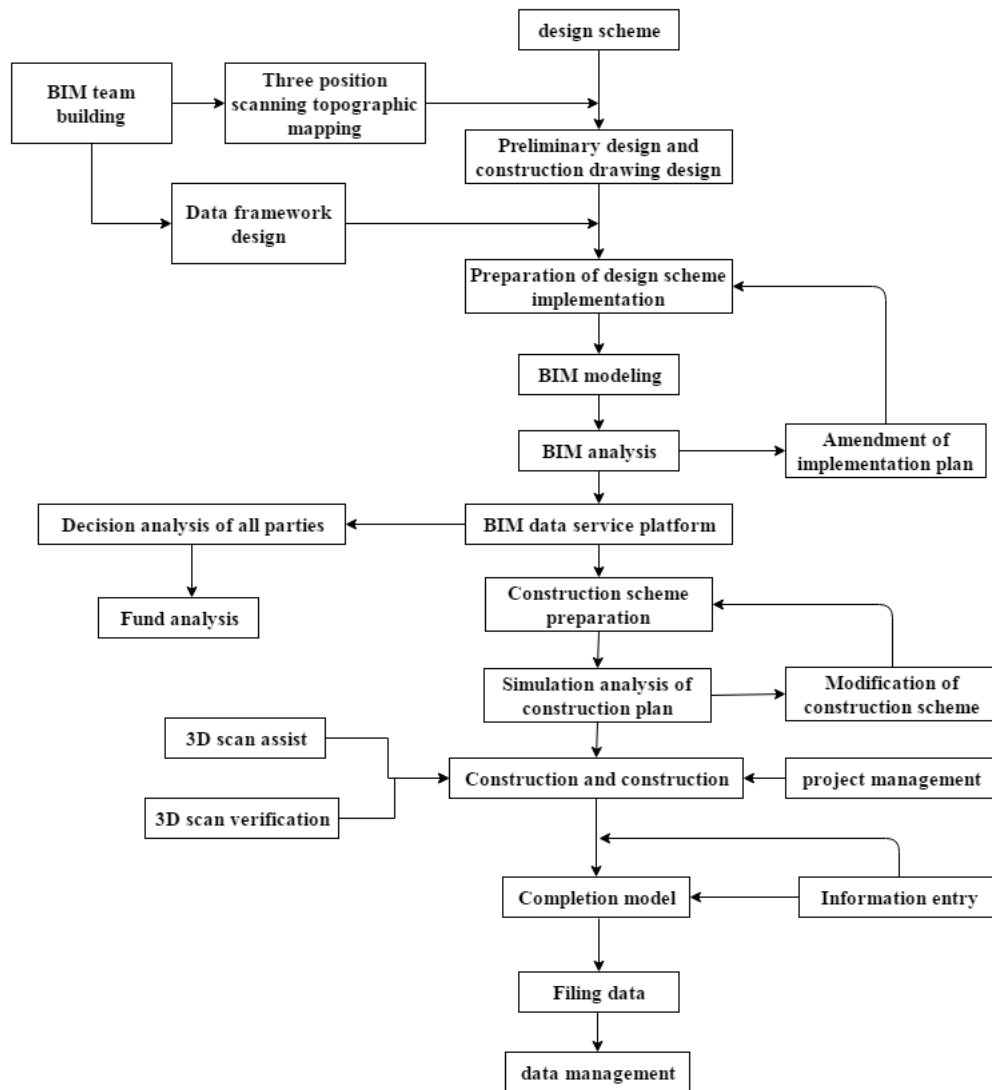


Fig.1 Database Model Established by Bim Technology

4. Application of Bim Technology in Underground Karst Engineering

4.1 Using Bim Technology to Design Project in Advance

BIM technology can be used in underground karst engineering to deal with the construction of karst cave area. For example, in a certain construction range, there is a curve construction, it is necessary to use BIM technology to design the area in advance and determine the location of different holes. This avoids the difficulty of actual construction to a certain extent. Using BIM technology to design the underground karst engineering in advance can not only ensure the smooth progress of the follow-up construction, but also prevent the possible problems in advance. In the lower karst engineering, there may be inaccuracies in geology, surveying and mapping and exploration. The design in advance can integrate these data and prevent possible problems to a certain extent.

4.2 Integrated Analysis of Engineering with Database

Using BIM technology to design the project in advance can promote the smooth progress of the project. By using the database established by BIM, the underground karst engineering can be analyzed in an integrated way. Because the engineering drawing designed by BIM not only has the characteristics of digitization, visualization, multidimensional, simulation and coordination, but also runs through different stages of engineering design, construction and operation. By using BIM database for karst exploration, the exchange and storage of address information are realized, and the integration of technical information is realized while the integrity of information is guaranteed. At the same time, based on the data, using BIM technology to make three-dimensional model, this design is very clear and intuitive, very convenient in the application of the project. It effectively improves the rationality of engineering geological analysis and evaluation, and can also record the geological properties and analysis process of the project, and trace the design results quickly.

4.3 Using Database to Make Different Models for Different Projects

In the construction of underground karst project, the database established by BIM can be used to model the project. This kind of three-dimensional modeling is an accurate three-dimensional model drawing made by a large number of data through a specific mapping software, rather than a simple digital simulation. For example, through GOCAD modeling, different data such as stratum, rock stratum, structure and physical phenomenon of geological body in engineering can be integrated to form a set of 3D spatial geological analysis map and 3D model. This model can also be switched to two-dimensional diagram, so it is more efficient in engineering management, it is also convenient for database management, and it improves the multi-disciplinary collaborative design of engineering. Through the database modeling of underground karst engineering, we can effectively improve the geological mapping, geological exploration and other targeted work before construction. To some extent, it also saves the drilling workload in the construction of underground karst engineering.

Acknowledgement

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