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Research on Quality Control and Management of Construction Engineering Based on Bim

Yingying Li

Rizhao Polytechnic, Rizhao, Shandong 276826, China

4953980@qq.com

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Abstract: With the rapid development of China's construction industry, the building structure is becoming more and more complex, and the construction requirements are getting higher and higher. The quality control mode used in the construction process of current construction projects can no longer meet the development needs of China's modern construction industry. In the actual construction process of the project, engineering changes and quality problems often occur because of the limited efficiency of construction management or communication problems among the project participants. The emergence and continuous development of BIM technology has brought profound changes to the whole construction industry and made it possible for the informatization development of the construction industry. BIM technology can not only improve the traditional management mode, but also update the management concept, so that the construction project management can be improved and developed more effectively with the help of BIM technology. Based on this, this paper expounds the concept and characteristics of BIM, and puts forward corresponding strategies for the implementation of BIM in construction process quality control, so as to promote the improvement of automation level of construction quality control in construction industry.

1. Introduction

With the development of science and technology, the acceleration of urbanization and the improvement of people's living standards and quality of life, people begin to have higher and higher requirements for the function, appearance and comfort of buildings [1]. These also lead to more and more functions of buildings and more complex construction process. For the construction industry, the construction quality of construction projects is very important. With the rapid development of China's construction industry, the building structure is becoming more and more complex and the construction requirements are becoming higher and higher. The quality control mode used in the construction process of construction projects can no longer meet the needs of the development of China's modern construction industry [2]. There are many problems in the traditional construction process quality control, such as low degree of informatization, difficult and difficult collaborative work, poor visualization effect, many unforeseen problems and so on. Therefore, it is necessary to improve the effectiveness of construction quality control [3]. Using the visualization, informatization, coordination, consistency and other functions of BIM (building information model)

technology, we can intuitively simulate the construction process in terms of deepening design and risky special technical schemes, provide corresponding solutions to the problems existing in the construction process, and provide great help to the quality and safety management of construction projects [4].

At present, the manufacturing industry and other fields have achieved fine management. Due to the influence of many factors such as large building scale, increasingly complex functions, many participants and backward construction management technology, the construction quality management is still in the state of extensive management [5]. In the construction process, due to the factors affecting the construction quality, coupled with the large construction volume of some large construction projects, the construction technology involved is also relatively advanced, which increases the difficulty of quality management of construction projects [6]. The emergence and continuous development of BIM Technology has brought profound changes to the whole construction industry and provided the possibility for the information development of the construction industry. Through the application of BIM Technology in construction engineering, the whole process of project implementation can effectively reduce the time required for project operation, save labor costs and reduce the invested funds, and improve the efficiency of project completion [7]. This technology can not only improve the traditional management mode, but also update the management concept, so that the construction project management can make more effective progress and development with the help of BIM Technology [8]. This paper expounds the concept and characteristics of BIM, and puts forward corresponding strategies for the implementation of Bim in construction process quality control, so as to promote the improvement of construction quality control automation level in construction industry.

2. Application of Bim Technology in Construction Project Quality Management

Because the construction project is complex and involves a wide range of areas, in order to improve the quality of construction project management, it is necessary to use BIM technology to improve the management system, so as to facilitate the efficiency of relevant staff to query the required data. The application of this technology can not only provide workers with more detailed data, but also update and store it according to daily data information, so as to achieve real-time. BIM technology is to establish a quantitative model in the process of drawing design by using three-dimensional view to realize the visual management of the whole construction process. It can monitor the size, position and material of each component in the project in real time and cover all the parameters needed in the construction process. BIM technology can simulate the environment of engineering construction, effectively identify some potential safety hazards in engineering construction, simulate and reproduce every subtle link in the construction process, realize the early inspection of the construction scheme, and get a preliminary understanding of the dangerous situations on the construction site, make preparations for emergency prevention in advance, and reduce possible safety accidents during construction. Therefore, improving the technical level of BIM and using this technology in practical work can not only provide convenience for staff, but also reduce some unnecessary problems.

In the process of engineering construction, once an emergency occurs, BIM technology can play its regulatory role, and the model will automatically adjust with the change of the actual situation. The method is fast and convenient, and will not affect the normal operation of the whole project. In fact, the use of BIM in the process of building construction is to find out the problems in building construction, take simple and quick ways to effectively solve them, and further improve the construction scheme of engineering construction. BIM technology has good practicability in construction engineering. It can be used in both design and construction stages, and can effectively

improve the management level, which plays a vital role in promoting the development of construction engineering. In the use of this technology, not only the building structure can be displayed in three-dimensional form, but also the relevant staff can understand the design and construction direction in this model, and can also follow up the progress of the project in real time [9]. After the introduction of BIM technology in the construction preparation stage, the BIM model can be quickly and accurately established before construction as the basis of BIM technology application, because the building information model contains a large amount of information needed for construction. In the process of building construction, different construction schemes have different characteristics. Housing construction is mainly divided into foundation and foundation engineering main structure engineering and later decoration engineering. With the application of BIM technology, the layout scheme design of three different construction stages is realized at the plane position, and at the same time, the optimization and integration among various design schemes are realized, and then a set of layout scheme which is most beneficial to engineering construction is merged. Using BIM technology, the feasibility of engineering design can be evaluated anytime and anywhere. Figure 1 is the data source of building information database.

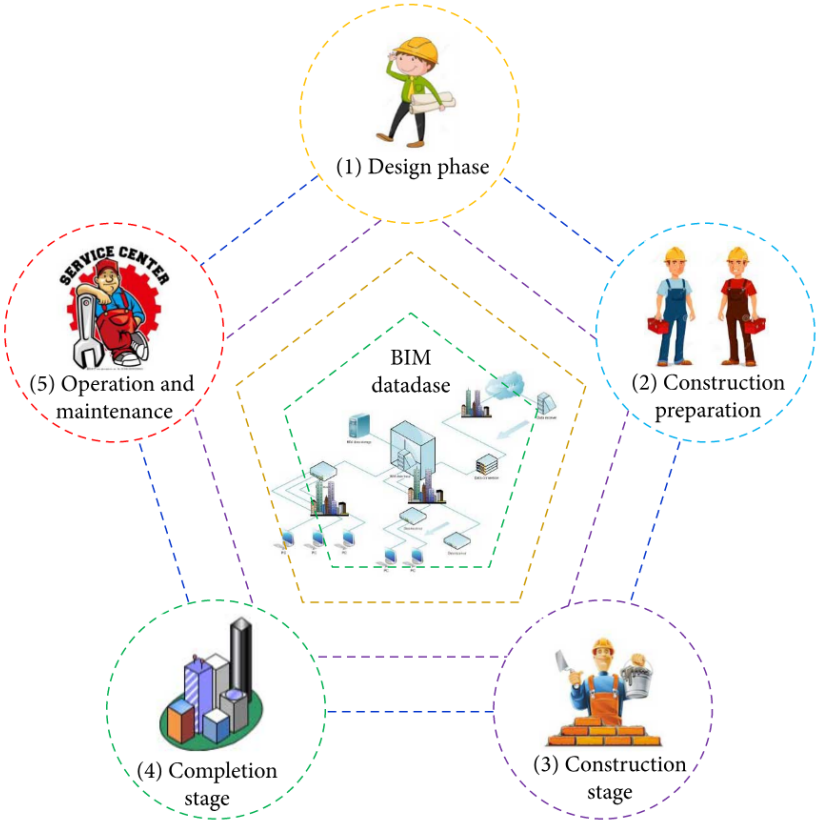

Fig.1 Data Source of Building Information Database

BIM technology is mainly used in the process of building modeling, which can improve the accuracy of the model by clarifying the data information of the construction site. In addition, BIM technology should be used as much as possible in modeling. Compared with traditional technology, this advanced technology has outstanding advantages, which can not only realize the whole process control of the project, but also realize the control and arrangement of data information, so that these data information can be effectively used in modeling, thus improving the management quality of the project. With the application of BIM technology, the management quality of construction engineering has been changed obviously. By using this technology and integrating information

technology, diversified management technologies can be created, which can not only effectively control the project quality, but also improve the management level, thus reducing the occurrence of problems and making the construction project go on schedule.

3. Manuscript Preparation

3.1 Improve the Management System

Improving the project quality management system and innovating the project quality management system can greatly improve the project quality management technology. Enterprises should develop their strengths and avoid their weaknesses, be good at learning from excellent enterprises at home and abroad, learn from the excellent management mode of other enterprises, or organize professional personnel to learn from other excellent enterprises, so as to improve the skills of talents and lay a knowledge foundation for the sustainable development of enterprises. An important feature of BIM Technology is visualization. Relying on three-dimensional model and professional thinking mode, it can show staff a more vivid engineering structure system, and make them understand more detailed data information by improving clarity [10]. The first mock exam of BIM system can simulate all the processes of concrete column construction, so as to compile scientific and reasonable sequence of construction technology, and refine the activities of every process, so as to ensure the feasibility of actual construction. The 4D simulation of the system is also carried out.

3.2 Innovating the Quality Management Mode of Construction Engineering

Innovation of management mode is also a very important method. In order to adapt to various complex and uncertain characteristics of enterprises, traditional old methods cannot be adopted. Therefore, enterprises must combine their own actual situation with the characteristics of the project to carry out effective and targeted innovation, and make a reasonable planning system to meet the needs and requirements of the market and adapt to the rhythm of the market. For all kinds of quality information data generated in the process, it can be integrated by using Internet technology in the background, and the integrated data can be sorted and stored to form a BIM model database. This database contains all the data information in the whole process, such as construction drawings, construction contracts, specific conditions of each construction stage, construction quality, etc. Relevant managers can call the required data at any time or analyze the data. In terms of construction technical quality, BIM technology can simulate the construction technical process, so as to establish the standard, and the staff can work according to the relevant process standards, so as to realize the effective fit between the plan and the actual construction. Through the rational use of BIM model, cost control and cost prediction can be achieved, which can better provide a reasonable basis for project bidding and cost control in construction.

4. Conclusions

The application of BIM technology in construction engineering can not only promote the development of China's construction engineering industry, but also effectively improve the quality of China's construction engineering, which plays a very important role in improving management. To a certain extent, BIM technology is the inevitable trend of future architectural development, which can realize the three-dimensional and informatization of engineering management. Through the new model, the whole life cycle information of construction engineering from design and construction to operation and maintenance can be better realized. Construction enterprises should

correctly understand the great advantages and industry potential of BIM technology, actively change their thinking mode, and attach importance to the research and development of new technologies and the cultivation of applied talents. In practical work, we should pay attention to the application of BIM technology and master its operation methods to give full play to the role of BIM technology in improving the quality control level in the construction process. Construction enterprises should pay more attention to site management, and improve the quality of site management by raising the awareness of managers, improving the safety ideas of construction workers and increasing management systems, so as to effectively guarantee the construction quality of civil buildings and enable construction enterprises to have better development.

References

[1] Ma Chongsen, Xu Qin, Yan Wei, etc. Construction Engineering Quality Supervision System Based on BIM. Reform and Opening, vol. 506, no. 5, pp. 22-25, 2019.

[2] Cao Jianghong, Ji Fanrong, Xie Benzheng, et al. Quality management of prefabricated buildings based on BIM. Journal of Civil Engineering and Management, vol. 34, no. 3, pp. 108-113, 2017.

[3] Aredah A S, Baraka M A, Khafif M E. Project Scheduling Techniques Within a Building Information Modeling (BIM) Environment: A Survey Study. IEEE Engineering Management Review, vol. 47, no. 2, pp. 133-143, 2019.

[4] Scherer R J, Katranuschkov P. BIMification: How to create and use BIM for retrofitting. Advanced Engineering Informatics, vol. 38, no. 10, pp. 54-66, 2018.

[5] Zhao Xinyi, Guo Xiao. Research on construction engineering quality inspection methods based on BIM and 3D laser scanning technology. Civil Engineering Information Technology, vol. 61, no. 5, pp. 135-138, 2020.

[6] Bian Yuan, Zhao Junqing, Wang Dongming, et al. Application research of 3D reconstruction technology in railway BIM operation and maintenance management. Railway Computer Application, vol. 30, no. 7, pp. 85-89, 2021.

[7] Liu Jian, Wang Haiyan, Wang Lei. The application of BIM technology in construction safety management. Building technology research, vol. 4, no. 1, pp. 94-95, 2021.

[8] Yu Haotian. Design and implementation of construction engineering quality supervision and management system based on BIM. Engineering Technology Research, vol. 4, no. 18, pp. 128-129, 2019.

[9] Xiao Yang, Liu Wei. Research on the Application of BIM Technology in the Quality Management of Prefabricated Building Construction. Value Engineering, vol. 482, no. 6, pp. 104-107, 2018.

[10] Wang Xin. Research on the application of BIM technology in the construction quality management of prefabricated buildings. Building materials development orientation, vol. 18, no. 1, pp. 141-142, 2020.