

Discussion on Quality and Safety Control of Housing Construction Project Management Based on Bim

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Abstract: In recent years, the construction industry has developed rapidly in my country. Looking at the economic situation, the construction industry-driven economy has gradually occupied a place in the comprehensive main economic industry. Construction production has always been a high-incidence section of safety accidents and safety accidents. The central issue of quality and safety management is to protect the safety and health of people in production activities and to ensure smooth production. Due to the continuous emergence of various landmark large-scale complex structures, the architectural structure is gradually changing to the direction of ultra-high, large-span and unique shape, making the traditional two-dimensional graphic design methods unable to meet the current actual engineering needs, and the construction difficulty The increase in the number of projects and the continuous acceleration of the project progress have brought unprecedented challenges to the design institutes and construction units. Combined with the development and application status of BIM in my country's construction industry, the application obstacles of BIM in construction engineering are analyzed and studied. In response to these obstacles, some suggestions and countermeasures are given based on the application standard level, application technology level and application management level.

1. Introduction

Because all aspects of people's life have been greatly improved now, everyone's house was once just used to keep out the wind and rain, but now the quality of people's living standard is actually reflected in the quality of the house. In today's global economic integration, how to ensure the maximization of economic benefits and further enhance the core competitiveness of construction enterprises under the premise of ensuring "safety and quality" has become a problem worthy of deep consideration by construction enterprise managers[1]. In order to optimize the design process, improve the whole construction quality and work efficiency, reduce the uncertain factors in the construction, and make it more conducive to the project management and cost control, in this process, it is necessary to introduce BIM technology to establish a visual real structure model and simulate the whole construction process of the project[2].

With the development of global economy, China's economy is also advancing steadily[3]. However, the international economic environment is complex and unpredictable, and China is also affected by it[4]. The construction industry has developed rapidly in recent years and has gradually become an important material Department of the national economy . While the construction industry has made great progress, we should also pay attention to the hidden dangers behind it[5]. Construction engineering quality accidents are the top priority[6].The basic concept of BIM is to realize the seamless transmission and full sharing of information in the whole life cycle of the project, and the practice of BIM at home and abroad has proved that BIM can reduce production costs, improve technology, save resources, and control progress[7]. Therefore, the application of BIM in construction project management has become a very important and popular research topic.

2. Research Status and Significance

2.1 Research Status At Home and Abroad

At this stage, according to the requirements of digital information design, the world has put forward the building information modeling (BIM) technology, a method that participates in the whole life cycle activities of building structures, contains various engineering information, and can realize visualization and whole process construction simulation. It has brought a new revolution to the construction industry. At the same time, it is also the inevitable trend of the development of the construction industry. Since the advent of BIM, as an innovative tool and management method, it has been proved to be of great value by countless practices in European and American developed countries. Europe, America and other developed countries, including South Korea, Japan and Singapore in Asia, are actively promoting BIM application technology and conducting research and development of related theories and technologies, and are committed to further improving the competitiveness of domestic construction enterprises in the global market. In China, there are many problems in the construction process, which need to be managed by scientific methods and technologies[8]. The application of BIM technology has become one of the scientific methods to solve these problems. At present, the application of BIM technology in China is still in its infancy, and its application scope and approach are relatively narrow. Studying the application of BIM technology in residential construction quality management and improving the development status of my country's residential construction industry will effectively improve the development of related industries and promote the stable development of my country's construction industry. The schematic diagram of part of the BIM system is shown in the figure 1.

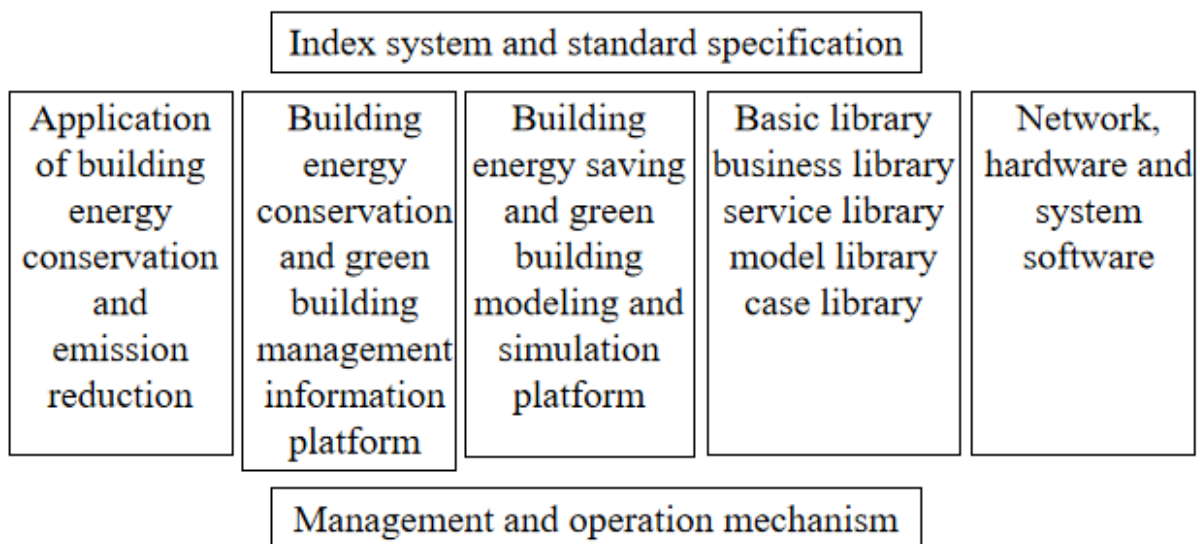


Figure 1 Architecture of Building Energy Efficiency and Building Quality Model System Framework

2.2 Research Significance

In recent years, China's overall economic situation has continued to rise. At the same time, the process of China's infrastructure construction is further promoted, which not only brings great opportunities to construction enterprises, but also makes the market competition in the construction industry increasingly fierce, and the quality of the project directly determines the success of the competition. BIM can help construction enterprises simulate the construction scene, understand the possible problems in the construction stage through the simulation data, and further implement the solutions to control the risk rationality[9]. Moreover, through the analysis of the data model, it can also provide feasibility guidance for the later construction links, better implement the overall construction scheme, and fully allocate each means of production, so as to make the best use of resources, which plays a very important role in the development of the overall construction project.

The application of BIM Technology can effectively improve the construction quality, make unified planning for the components required for prefabricated buildings from production to

transportation to final installation, and reasonably arrange the construction time, so as to make a fine comparison between the expected progress of housing construction engineering and the actual progress. It is helpful for managers to optimize the management of all aspects of housing construction. BIM Technology makes construction engineering tend to be refined. Using BIM Technology for construction quality management can improve the standardization level of enterprises in the project, greatly save human and material resources, improve project quality and enhance competitiveness.

3. New Technology of Construction Engineering Control - Bim

3.1 Introduction to Bim

BIM technology, namely building information model. BIM is to summarize the three-dimensional space, geometric model and detailed structural information of each part of the building, show it through digital model, and use Internet technology to realize information synchronization. BIM is a shared knowledge resource, which can fully share information about facilities and provide reliable basis for all decisions in the whole life cycle of the facilities from conceptual design to dismantling and scrapping. At different stages of the project, different stakeholders insert, extract, update and modify the building information in BIM to support and reflect the collaborative operation platform of their respective responsibilities. BIM Technology can use the visual three-dimensional model to design and construct the building engineering, reduce the deficiency of the original plane expression, and use the three-dimensional form to express the building form and related structures, which is more easy to understand, which not only greatly improves the engineering efficiency, but also reduces the error; Use the simulatability to simulate the structure, model and construction steps in advance to predict possible problems and reduce omissions; Using the optimization, during the completion of the construction project, it needs to be improved and modified many times according to the site conditions from the formulation of the initial scheme to the construction[10]. BIM Technology integrates geometry, physics and basic concepts in architectural engineering knowledge, and makes comprehensive optimization in architectural engineering possible. BIM will become one of the core competitiveness of construction enterprises, and BIM will eventually become a revolutionary technology of construction productivity.

3.2 Application of Bim in Construction Project Management

In the quality management of construction projects, BIM technology can realize 3D visualization, and realize the simulated construction process of the actual project site by using digital modeling technology. , feedback and modification, so as to carry out dynamic whole-process monitoring of quality problems of engineering projects, and timely check and correct deviations.

In the design, first, it is necessary to establish the construction safety index of construction engineering, and give full play to the advantages of BIM Technology through the establishment of safety index. Second, it is necessary to improve the protection of the construction scheme in the construction process. BIM Technology can be used to establish the protection performance of the construction scheme. Building construction is a process of collaborative construction of various disciplines. BIM Technology should be used as an auxiliary means to participate in the process from building design to service life cycle summary. BIM Technology should be used to establish a model so that the design results of various disciplines can be displayed intuitively and vividly, and digital display can be used in the process of project construction, Relevant technicians can also make the monotonous and boring traditional design vivid and three-dimensional through BIM technical model demonstration, endow rich design images, reduce conflicts and errors among disciplines through collaborative design among disciplines, ensure that changes between construction are minimized, simplify the design process and shorten the design time, The efficiency is greatly improved.

The application of BIM technology in housing construction safety management is mainly

reflected in the application of BIM technology in housing construction management and construction cost management, which can make scientific and reasonable prediction, analysis, accounting and assessment of construction cost. The introduction of BIM technology has its unique role and advantages in solving the control of personnel, materials, machinery and other factors in large-scale engineering projects.

4. Bim and Quality and Safety Management Control

Quality includes the quality of safe work, and the concept of safety also connotes quality, interaction and mutual cause and effect. Safety first and quality first, the two are not contradictory. Safety first is put forward from the perspective of protecting construction production factors, while quality first is emphasized from the perspective of caring about construction products and achievements. The core content of BIM technology is to establish a virtual 3D visualization model of construction engineering in a computer platform, and at the same time use advanced digital information technology to build a complete construction engineering information resource database that is consistent with the actual situation. BIM can intuitively reflect the whole construction process, predict the possible problems in the construction process in advance, and avoid unnecessary safety accidents in the construction process. The visual guidance construction scheme enables the owner, design unit, construction unit and supervision unit to communicate and share resources on the collaborative work platform of BIM, so as to realize the collaborative docking of the whole construction process. Virtual construction and simulation and deepening of key nodes can find out whether the connection in the construction process is wrong and improve the safety level of construction production. At the same time, visualization is also convenient for all parties to supervise and manage the construction process, timely and effective feedback information, prevent accidents, avoid tofu residue project and other similar situations, and ensure the quality of construction project.

5. Conclusions

Under the impact of the global financial crisis, how to further ensure the maximum economic benefits of enterprises and further enhance the core competitiveness of enterprises under the premise of ensuring “safety and quality” in the construction industry has become a problem worthy of deep consideration by the managers of the construction industry. It can be seen that BIM collaborative design, as an architectural design method with broad prospects, will certainly provide a brand-new method and approach for architectural design projects. With the continuous development and improvement in the future, the whole real estate industry chain will continue to grow, and collaborative design will inevitably become a mainstream design method in the future and gradually replace the traditional design. Understand the technical means of BIM and its advantages in quality control, introduce BIM into building quality management through the problems in traditional building quality management before, and formulate BIM technical quality control system. With the progress of science and technology, BIM technology will be combined with a variety of technical means, at the same time, the application scope will be increased, and the overall application level will be improved.

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