Research on Building Engineering Management Intelligence Based on BIM

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Keywords: BIM; Construction project management; Intelligence

Abstract: With the development of social economy, intelligent buildings expand the performance of traditional buildings, and take the work, production and living needs of modern society as the basis for building development. The advantages of intelligent buildings make the construction industry gradually pay attention to its development trend, and ensure the construction quality and progress of building projects through its relatively strong performance. At this stage, the technical management system of the construction industry is not comprehensive and perfect, and needs to be further improved. Therefore, this paper will further study the intelligent management of construction projects based on BIM. Building components established by BIM software have the same form in different buildings, which is conducive to the reuse of building component elements. BIM model not only includes three-dimensional geometric model, but also can be used in the whole life cycle of construction projects in terms of time, function, materials, etc., to make the information expression more clear. Based on the main body of BIM technology management, the management level is divided, and the basic objectives are defined from the perspectives of the owner, supervisor, design, etc., so that the management objectives can be completed by stages. The construction cost analysis of each stage shall be detailed and refined to achieve the comprehensive and refined monitoring of the construction cost.

1. Introduction

On the basis of traditional building engineering, the intelligent system engineering established through the integration of various high and new technologies is the intelligent building. Intelligent building engineering is a new intelligent system based on the reform of traditional building engineering and established in the process of building introduction. With the continuous progress of science and technology in our country, intelligent buildings have also helped the actual construction industry to expand in terms of the original architectural functions. With the development of social economy, intelligent buildings expand the performance of traditional buildings, and take the work, production and living needs of modern society as the basis for building development. The advantages of intelligence make the construction industry gradually pay attention to its development trend, and ensure the construction quality and progress of construction projects through its powerful performance [1-2]. If the project management is not scientifically managed, it will affect the unreasonable allocation of resources of construction enterprises, reduce the efficiency of construction project management, and its diverse functions meet people's work needs. Just because of its unique characteristics, intelligent building will surely become an important trend of future buildings, which will directly affect the quality and progress of construction projects, which is not only detrimental to the quality of construction projects, but also to the progress of construction projects. Therefore, it is very important to strengthen construction project management [3]. Only those buildings with good quality and high performance can be invincible in the competition. However, at present, there are still many problems in the quality of China's construction industry, which affect the development of the whole construction industry.

At present, the technical management system of the construction industry is not comprehensive and perfect, and needs to be further improved. Therefore, this paper will further study the intelligent management of construction projects based on BIM. Specifically, the technical management of

many construction enterprises is only limited to simple document arrangement and rough quality management, which has not fundamentally improved the technical management level. Building components established by BIM software, the same model has the same shape in different buildings, which is conducive to the reuse of building component primitives. BIM model not only contains three-dimensional geometric model, but also can be used in the whole life cycle of construction engineering in terms of time, function and materials, so that the information expression can be clearer [4]. However, there are still many shortcomings in BIM engineering model at present. BIM engineering is a systematic engineering, which can only be completed across disciplines and units. Because of cross-discipline and cross-industry, it is very difficult to find such all-round talents among various main units, which is also an important reason for the scarcity of BIM talents [5]. In addition, construction enterprises should have a deep understanding of the legal awareness of claims, and claims must be settled through consultation according to the relevant contents of the contract terms, which is more convenient for the follow-up work of construction enterprises.

2. The background of building engineering management intelligence

2.1. Improving the quality and safety management level of construction projects is the requirement of the times.

Intelligent management of construction is a kind of management method that uses scientific management system and advanced information processing methods to manage the project, which can make the management more scientific and reasonable. As an important part of engineering construction, the level of construction site management is not only related to personal and property safety, but also directly affects the quality and level of engineering construction and the operation and development of construction enterprises. In the design, they also don't pay attention to the intelligent design of buildings, but still apply some traditional designs. In view of the demand of intelligent building design, designers must also understand some intelligent markets based on their basic development characteristics, so as to help intelligent design become more systematic and perfect, and complete the overall development [6-7]. There are two bases to realize intelligent management, the institutionalized guarantee of strict consciousness, and the computer technology guarantee of design and analysis process. Intelligent management is more scientific and accurate than direct management of engineering by people. As far as the existing development process is concerned, the management of construction units in China is generally a kind of management process based on construction personnel or construction leaders. Its management development plan is rather monotonous. In the process of management, they did not hire professional managers to carry out management work.

Therefore, the implementation of intelligent management in the construction site is a major innovation in the management mode of the construction industry, a major measure to reshape the image of the construction industry and improve the competitiveness of enterprises, and an inevitable trend of the development of the construction industry. Intelligent building combines traditional building engineering with a new building system formed by various high-tech specialties. Its advantages involve many aspects, deepening the contents of many fields, making it a more advanced complex, and becoming the main form of building engineering in the trend of intelligent development.

2.2. The development of Internet technology provides a platform for the deep integration of engineering management and new technology

The meticulous management of the construction site from point to surface is carried out according to the procedures specified by the software, which not only improves the management efficiency, but also saves the labor cost. In the past, two or three people could not manage things well. Now, under the guidance of the software, one person can manage things well. Most construction enterprises still stay in the aspect of objective consciousness when they understand the intelligent building construction, and they do not have a deep understanding of it. This leads to

some random requirements in the construction process. In the field of construction development, some regular construction concepts do not match the actual construction requirements. The construction enterprises and construction units did not clearly understand the meaning of intelligent systems, and did not contact the actual situation when putting forward requirements and problems. In addition, the contractors did not have the concept of demand planning, which resulted in the construction of intelligent building standards through a large number of technical systems, which could not guarantee the effectiveness of construction projects [8]. Through the mathematical statistics function of the system, the data analysis results can be timely provided for the reference of the decision-making level of the project department, so that it can be efficiently managed according to the first time principle, realizing the first time discovery, first time processing, first time feedback, first time summary, etc.

At this stage, many enterprises do not pay attention to the project management technology. They do not carefully check the construction links during the construction, which leads to quality problems. Moreover, the professional quality and cultural quality of the construction personnel are not high, so that the construction personnel can not master the construction technology skillfully, which is easy to make the buildings fail to meet the standards. Modern construction project management is a process based on scientific management system and technology to achieve management objectives, which is highly scientific. The organizational form of project management established according to modern management theory can effectively improve the efficiency of construction and ensure the realization of project objectives. Building units often lack some systematic planning concepts through Internet technology to make intelligent construction of buildings [9]. Its most fundamental feature is also that the building is intelligent, which requires a certain building coefficient to judge it. Such a building construction process reduces the effectiveness of the construction process.

3. Application of BIM in Fine Engineering Management

3.1. Application in planning and design

The stage of architectural planning and design is the initial stage of construction project management. The existing problems include: the owner's cognition of BIM technology in the application of architectural planning and design; The cooperation degree of architectural design enterprises for using BIM technology. Construction project management plays a very important role in the quality and safety of construction projects. Only by strengthening the intelligence of project management can we implement all tasks of the project and ensure the construction quality and safety at all stages of the project. The application of BIM technology in construction cost management mainly relies on the connection between BIM technology and cost software to calculate the corresponding bill quantities and quota quantities in real time, and then calculate the relevant costs according to the corresponding charging standards [10]. The intellectualization of management system based on BIM technology includes many aspects. Before construction, we should adopt intelligent management system to ensure the quality and level of construction organization and design. During construction, we should adopt intelligent management system to ensure the smooth progress of construction. These systems are designed to ensure the realization of intelligent management of building projects. In the design work, the architecture, structure, BIM model, HVAC, information sharing model and other disciplines work based on the same model. Each discipline designs its own model, and other disciplines do not need to wait for information, as shown in Figure 1.

Professional designers can take the initiative to eliminate the contradictions among different majors, find problems in time and make adjustments and optimizations, thus avoiding "information black holes", improving the design efficiency and quality of the project. The cost and threshold of BIM technology used by design enterprises, the corresponding unified national norms and standards for BIM design should be formulated as soon as possible, and a scientific training system for BIM design talents should be established through publicity and education and special funds [11]. In

different stages of the project, from the project feasibility study stage to the project completion stage, with the continuous modification of the project model, the cost information also changes in time, and the corresponding budget estimate, budget and settlement price are obtained, which truly achieves the dynamic management of the cost, and the cost at any time is clearly displayed.
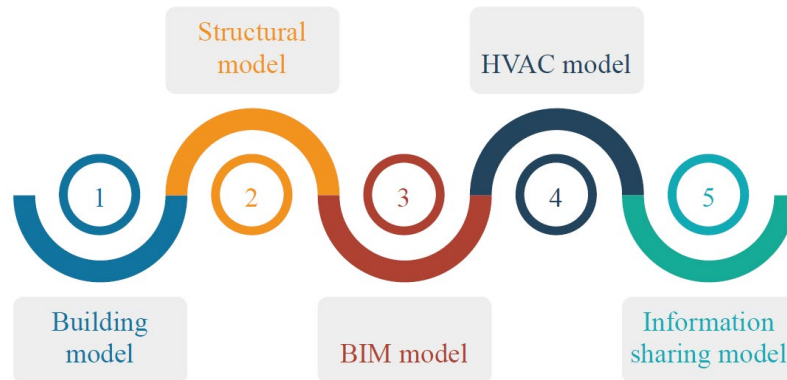

Figure 1 Application of BIM technology in the management of various models of construction projects

3.2. Application of Construction Organization Management

Through BIM technology, we can build a construction safety information management platform, which can quickly and efficiently deal with some sudden safety situations on the construction site, solve safety problems in a timely manner, effectively protect the life safety of construction personnel, conduct a reasonable assessment of the safety problems that have occurred, and find out where the problems are, so as to prevent such problems from happening again. There is a lot of information involved in the construction project management, and it is also worth considering how to make the information management intelligent. In the process of data sorting and application, we should strengthen the application of computers, which can reduce the occurrence of errors and deficiencies, and also can build a basic information system, develop a scientific and reasonable construction space planning scheme, To effectively guarantee the safe working space of the construction personnel, monitor the working status of the construction personnel at all times and in all directions, make risk assessment on the existing potential safety hazards, and establish a correction plan. In this way, BIM has become a communication platform for all parties involved in the construction, and has become efficient and fast in the management of multi discipline coordination, site layout optimization, working face management, etc. Based on the countermeasures of intelligent application of BIM technology to construction project management, the flow chart is constructed in this paper as shown in Figure 2.

In the dynamic cost control stage of construction, BIM technology is also introduced. Its advantages are mainly reflected in: the project revenue and expenditure can be included and summarized from an all-round perspective; The BIM technology is used in the management of quality information data, and the quality information is linked to the BIM model. Through model browsing, efficient circulation can be achieved at all levels. Compared with traditional document records, this method has the advantages of timeliness, clarity and large amount of information, which promotes the coordination of quality issues and optimizes the quality management and control means. Find out a more scientific entry point. In intelligent management, divide the management level according to the main body of management, and define the basic objectives from the perspectives of the owner, supervisor, design, etc., so that the management objectives can be completed by stages. The construction cost analysis of each stage shall be detailed and refined to achieve the comprehensive and refined monitoring of the construction cost.
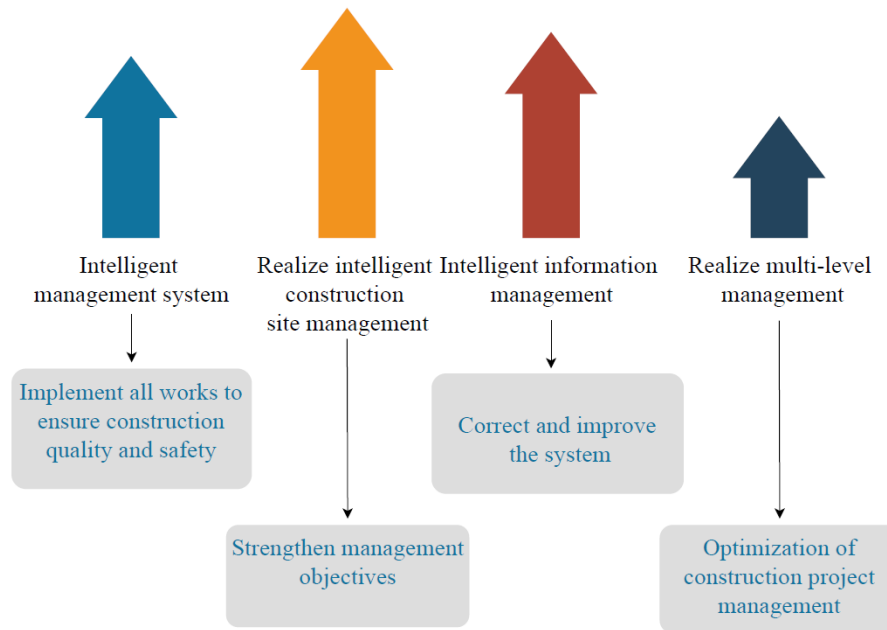
Figure 2 Countermeasures for intelligent application of construction project management

4. Conclusions

In the new era, intelligence has become an important driving force to promote social development. Strengthening the application of intelligence in the process of construction project management not only meets the requirements of the development of the times, but also improves the scientificity and effectiveness of construction project management. In this regard, based on BIM, this paper makes a further study on the intelligence of construction project management. BIM technology has a brand-new technical concept of project management, from planning, design, construction to operation and maintenance technology. Continuous innovation and change will become the inevitable trend of the development of building information and intelligence, which will realize the management of the whole life cycle of the building and improve the design and construction operation level of the building industry. In the economic management of construction projects, bidding and tendering system plays an important role, and is favored by many construction enterprises. Fair bidding and tendering system can not only improve the quality of construction projects, but also standardize the management of the construction market, in addition, it can improve the management level of related construction enterprises and ensure the better completion of construction projects. In the construction project management, intelligent management methods should be integrated from different angles, so that the overall quality and level can be improved and the whole project can be successfully completed. It is believed that in the near future, BIM technology will lead the development direction of construction engineering management and can be fully developed and applied in practical projects.

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