

## **Problems and Countermeasures of BIM Technology in the Whole Process Management of Construction Projects**

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**Abstract:** In the construction process of a construction project, the value of the project can be greatly improved by controlling the construction period and optimizing the construction cost. BIM technology can help a lot in this process. BIM technology is based on the building information model, which aims to realize information sharing in the whole life of a building. The whole life includes the processes of virtual engineering project planning, design, construction management, operation and maintenance. Thus BIM can help to optimize the key factors of project management, such as construction period and cost. At present, BIM technology is in the early stage of development in China, and there are still many problems in practical application. Based on the current market application situation, this paper analyzes some problems existing in BIM technology in the whole process management of construction projects, and puts forward some solutions.

### **1. Application of BIM Technology in Whole Process Management of Construction Projects**

BIM technology is the concrete application of computer technology in the field of construction engineering. BIM technology can effectively realize the establishment of resource planning, control of capital risks, energy conservation, cost saving, pollution reduction and efficiency improvement in the design, construction, operation and maintenance phases of the whole project. The application of BIM technology can change the traditional concept of project management and lead building information technology to a higher level, thus greatly improving the integrational degree of building management.

### **2. Problems Existing in BIM Application in China's Construction Stage**

BIM technology has been developed for more than ten years in our country. Now most enterprises have realized the value of BIM and actively applied it. However, there are some problems in practical application, and the ideal results have not been achieved. This paper analyzes the problems existing in BIM application in China's construction phase from the following three aspects, and discusses the solutions.

#### **2.1 Implementation and Improvement of BIM Standard**

In 2017, The Ministry of Housing and Construction officially approved the "Building Information Model Construction Application Standard" as the national standard, numbered GB/T51235-2017, which will be implemented from January 1, 2018. Prior to this, there was no unified standard in China's BIM market. People have different understandings about BIM. BIM involves many standards. From the earliest planning and design to the operation and management after the completion of the project, there are different delivery standards in every link. Unified delivery standards and data sharing are the key to ensure the wide application of BIM. Developed countries abroad have mature and unified BIM standards. Compared with foreign countries, the development of China's construction industry is not balanced and there is a lack of perfect BIM application standards. If we want to realize the seamless connection between BIM technology and local construction industry, it is necessary to formulate and perfect our own standards.

## **2.2 Cost and Technical Threshold**

Enterprises need a certain amount of investment to realize BIM application, whether it is training and learning, software and hardware procurement or manpower allocation. Therefore, cost is the first threshold. Therefore, BIM implantation is both a challenge and an opportunity. BIM technology requires the formation of a technical system. That is to say, it is impossible for an individual, a profession, a department or a company to use BIM. It requires the coordination and unification of various professional departments and companies in order to realize coordination and make enterprises gain profits. BIM promotion requires the company to invest in more configured hardware and train more BIM employees. The promotion of BIM technology will definitely eliminate some technical talents who are backward.

## **2.3 Obstacles Caused by Current Situation of Domestic Construction Industry**

The current situation of domestic project construction is "fast design and slow construction", which is often a "trilateral project". But the Foreign project construction is "slow design and fast construction" in Developed countries. They are in sharp contrast. That is to say, in many cases,, the design stage requires the design to be completed as soon as possible in our project construction. But In the construction process, uncertainties are continuously clarified and solved, which virtually increases a lot of ineffective costs, negotiations. These have lengthened the construction period in order to resolve claims and changes. The essence of BIM technology is to build the house in the computer first, and strive to solve most unclear details in the design stage, which requires designers to consider a large amount of information in the design process. This makes many designers unaccustomed. Of course, the project has limited funds and time to support the designers. BIM technology makes the quantity and materials of projects transparent. If high-quality coordination is realized, changes and negotiations will be reduced. Under the strong impetus of the government, more and more enterprises realize that the worse the market is, the more they need to control costs. Therefore, I believe that more enterprises will use the momentum to promote the application of BIM technology, and once the application of BIM reaches a certain market proportion, it is inevitable that the whole market will follow the trend .It just like the popularity of CAD 20 years ago, the popularity of ERP and calculation software 10 years ago. The market shows rejection and resistance first. However, once the application proportion exceeds the critical value and the ecological circle tends to mature, the popularization speed in the whole market will be amazing.

## **3. Countermeasures**

First, the state must issue regulations to guide enterprises in the direction. The construction unit as the leader must train BIM professional teams to drive the application of BIM in projects, and to make BIM application professional. To promote BIM in China, the role of a strong government is absolutely crucial. Corresponding policy support for BIM can accelerate the process of BIM in China. In terms of total social cost, total production efficiency and environmental protection, the promotion of BIM is a necessary and promising undertaking for the government. The state has taken BIM building information model system as the key research project of the "11th Five-Year Plan", such as the "Research and Application of Key Technologies for Construction Informatization". From the perspective of the market and in combination with the practice in developed countries today, there is no doubt that the biggest profit-making party of BIM is the developer of construction projects. As a developer, the application of BIM can bring about substantial cost savings. Also the construction period can be controlled. Of course, the final implementation of BIM still requires cooperation from all aspects.

Second, the construction of a unified BIM transmission platform. At present, many software companies in our country have developed BIM software. The BIM products are also put into the market. How to realize data sharing and transmission of various software needs to be solved urgently. So that various BIM products can be transmitted smoothly and data loss can be avoided as much as possible during transmission. In terms of professional configuration, BIM is now mainly

focused on the application of architectural design. There are few applications for structural, water supply and drainage and other specialties, and there is a lack of effective three-dimensional collaborative design mode. Usually the construction profession is designed with BIM, But It can't raise funds for other professions. It has to go back to CAD from BIM. Based on the above problems, manufacturers researching, developing and promoting BIM technology should widely collect various problems and various information materials generated in the use process of customers. Then, they must combine the actual needs and working modes of different design industries, to sort out corresponding, feasible and effective three-dimensional collaborative design processes. Finally they must assist users to realize the transition from CAD to BIM as soon as possible.

Third, strengthening the training and education of BIM talents. We must promote the training of BIM talents in universities and training institutions. Gradually we make BIM application universal and comprehensive, and carry out BIM qualification certification for BIM's rapid development. Although BIM has been developed in China for more than ten years, talents are still very scarce. One aim of the education and teaching reform in higher vocational colleges is to train practical talents needed by the society. As training skilled talents and application-oriented talents, we must keep up with the market orientation. Schools should offer BIM-related courses to enhance students' professional knowledge, ability. Enterprises need qualified technical talents, so as to promote the promotion of BIM technology in the construction industry.

Fourth, uniforming standards. Currently, as the BIM data standard, IFC standard has become increasingly mature in the world. Some of the biggest software developers, such as Autodesk, create software that exchanges data directly. They does not require much of a standard. In fact, there are many different types of BIM software with different functions to apply BIM data to the whole life period of construction projects. In order to ensure the data interchange between applied BIM software, it is necessary to issue data standards.

Fifth, optimizing BIM application mode. Optimization can be divided into two aspects: on the one hand, the technical mode of BIM needs to be optimized; on the other hand, the application mode of BIM needs to be optimized. At present, many enterprises only apply BIM technology in local links of engineering, such as collision inspection, mold turning, etc. Still others want to use one software or a few software to solve all the problems in the construction stage or even the whole life. In fact, everything can not be perfect, we should find a method to meet the actual requirements through practice, in order to form a good technology application mode. In the IPD mode, the owner, the designer, the general contractor and the subcontractor gather together to achieve good results in construction projects by using BIM technology. However, there is still a lot of work to be done to promote IPD in China. Because of our country's construction project contract mode and related laws and regulations are different with the foreign countries. Of course, as long as the courage to practice and explore, through efforts, it is completely possible to create a more effective BIM technology application mode suitable for China.

Sixth, attaching importance to the development of BIM software. BIM technology-based software in developed countries has been relatively mature, and most of the software has entered the Chinese market, such as Autodesk, Bentley and so on. The application of these software in our country is not able to meet the needs of China's construction engineering management. We must develop application software with independent intellectual property rights, so as to adapt to China's construction project management, and avoid being controlled by others.

The application of BIM technology is the general trend in construction projects. As the real estate market enters the "silver age", the role of BIM will be highlighted in construction project construction period and cost management. With the attention of the market, I believe these problems will be solved soon and enter the era of rapid development of BIM.

#### **4. Conclusion**

BIM technology is another important computer application technology in the field of construction following CAD (computer-aided design) technology. It has been rapidly developed and applied in some developed countries. At present, BIM technology is in the early stage of

development in China, and there are still many problems in practical application. Based on the current market application situation, this paper analyzes some problems existing in BIM technology in the whole process management of construction projects, and puts forward some directions for solving them. If you want to develop BIM technology, you need to pay attention to the development of application software based on BIM technology, strengthen the training and education of BIM talents, establish a BIM data transmission platform, and improve BIM related standards. At the same time, you should be brave enough to explore effective application models. Only in this way, BIM technology can play its due role in China's construction field.

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