Application of BIM Technology in Civil Engineering Construction Management

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Abstract

At present, the speed of scientific and technological development is accelerating. In the field of civil engineering construction, engineering technology has been reformed and innovated. BIM technology is a relatively new technology in current engineering construction. Although the construction industry occupies a large proportion of China’s economic composition, both the speed of development and the speed of industry expansion are increasing, it is still obvious that there are many problems in the construction industry. Therefore, in the process of civil engineering construction management, the introduction of BIM technology to solve the problems is a very effective means.

Keywords

BIM technology; Civil engineering; Construction technology; Applied research.

1. Introduction

The application of BIM technology in the construction industry is relatively extensive. BIM technology first appeared in the construction industry in the United States, but it is not a software, but a systematic technology. That is, after the whole construction project cycle can be concentrated, a visible and simulated building model can be established. It can provide a solution to all problems from design to construction management, so that the construction project can ensure the quality of the project during the construction process. Make the project achieve better results [1] Accordingly, the quality of civil engineering construction can also be greatly improved, this paper mainly discusses the effective application of current BIM proposals in civil engineering construction management, so that the construction industry can achieve certain development.

2. Main Implications of BIM Technology

BIM technology is not the kind of tool that is more common in the construction industry, or the related technology used in the construction process, but a new concept. During the construction of a civil engineering project, BIM technology can continuously provide the main scope of the design for the construction and construction of the project, as well as the progress of the project, and all the cost information contained in the project. Most importantly, the information is very complete and can be coordinated according to the relevant requirements [2] The greatest feature of BIM technology itself
is the building model, which contains a great deal of information, which is very closely related to the construction project. According to the traditional architectural drawing technology, these drawing techniques record only geometric information, such as points, lines, surfaces, bodies and other elements, while the application of BIM technology in building engineering is to construct the assembly information through a parameterized plastic film molding process, and a construction project requires the participation of many construction units, and the construction unit has many staff. There is also a need for more frequent communication and communication between units and construction personnel, identification of project issues and standards, etc [3] This is not only effective in stimulating staff creativity, but also timely in identifying problems in the construction process of construction projects and in taking effective measures to address them. Civil engineering uses BIM technology, which, although it is said to have increased twice as much in the process of pre-design and in the design of construction projects, significantly reduces the use of human resources and the cost of time as a result of automated graphic and text output during the management phase of construction engineering, which is also known as building information management, Generally speaking, 3D digital technology is used as an important basis to form an integrated digital model.

3. The Main Features of BIM Technology

3.1 Data processing and integration of information

For the construction industry, civil engineering projects are only a combination of them, so civil engineering projects also have various characteristics of the construction industry itself, that is, a lot of data needs to be measured during the construction process. Data such as length, including height, are very cumbersome and complex. Data processing is also essential, but because BIM technology can not only simulate civil engineering buildings, but also design schemes that can be graphically expressed, Most importantly, because this number can be stored by computer all the data previously applied, and don't worry, because of various errors, resulting in missing data, or copying errors, for some of the more important dimensions often used in engineering buildings, can be more accurate summary, and timely cost budget based on the terrain of the field construction at that time, thus effectively reducing the overall civil engineering workload, the corresponding staff efficiency can be greatly improved, the duration will be effectively shortened, and the information will be integrated. In the traditional construction process, a very important problem and defect is that the information of the whole engineering process can not be transmitted to all departments at the same time. Therefore, in the construction process, the project drawings will be scattered because of the time difference. The documents that need to be checked and verified are relatively large and difficult to be sorted out [4] And BIM technology can improve the traditional information integration and transmission easy to appear in the problem of information confusion, which is some information in engineering, can get the main reason of complete retention analysis.

3.2 Graphical

Before civil engineering construction, the whole building is designed and planned mainly through design drawings. Therefore, drawing is a major feature of the current construction industry, but it is precisely because the design scheme of civil engineering projects is generally expressed by drawing, so the drawings show only the plan of the construction project this year. Although the design drawings indicate the specific dimensions of each place in the building, it still looks very abstract. Although the design drawings are viewed by special designers, many workers involved in the construction of infrastructure projects, Also need to view and analyze the design drawings, have a certain understanding, only in this way can better know the construction work after [5] But because these workers don't have a high level of scientific literacy and do n’t know the principles of design, they simply can't understand the importance of some places in engineering buildings, so there may be work errors in this case. And then lead to the quality of the whole project serious problems.

BIM technology is a good measure to effectively solve the problem mentioned above. The characteristic of BIM technology is that it can make the construction of drawings more perfect, plus
three D of technical modeling. Can make the whole building engineering design more fragrant, because it is three-dimensional graphics, so basically can show the results of the whole design [6].

Before construction, design drawings and BIM models should be drawn. In the process, there are three main links: making design standards, establishing models and applying them in practice. According to the detailed requirements of the assembly building, the BIM model should be designed for the structure type, size and material. At the same time, all parameters are controlled by relevant technology. If the data changes, the relevant data will also change, so as to reduce the probability of drawing error and improve the overall level of drawing design [7].

This effect can not only make the effect diagram of the whole building project show, generate the corresponding report form, but also, more importantly, the communication and discussion link in the course of architectural design and operation. Can be carried out in visible circumstances, but also to facilitate the staff of various units to communicate and communicate on some issues.

### 3.3 Simulations

BIM technology can use the relevant simulation software, according to the construction schedule arranged by the construction organization to arrange the corresponding construction work, and can also be built on the basis of the model, plus the dimension of time, this medicine can be professional construction, and make visual progress plan, that is, the most important role of the four-bit construction simulation is BIM technology can make the construction sequence of the whole construction project clearer, the engineering quantity of different departments more clear, the BIM model and the construction period, It can make the construction coordination of different specialties more clear and clear, and can effectively combine some equipment and related materials into the construction site through construction simulation and construction organization scheme. Labor arrangement and distribution and other work arrangements become more economical, more efficient and effective to reduce the construction cost of the whole construction project, the same participation in the construction staff, work enthusiasm will be higher [8]. And in the process of construction, the realization of a data-based monitoring model, high-level managers do not have to go to the construction site to check, can effectively grasp the work of the staff of various departments, so as to more effectively manage and supervise the construction site, construction quality level, so that the construction site remote management becomes a reality.

### 4. Application of BIM Technology in Construction Management

#### 4.1 Quality control of civil engineering projects

The current economic situation in our country is constantly developing and improving, and there are more and more tall buildings, but there are still a lot of jerry-building projects, and in the process of traditional construction projects, there are often rework because of substandard quality, which is closely related to the lack of supervision during the construction process and the lack of serious treatment of the work by the staff. Of course, there are also some reasons because problems have been found in the construction stage, but they do not care about them, and they can only be returned to the process after the completion of the project and re-built [9]. If these problems are discovered again, they are corrected in a timely manner, and the construction is carried out correctly, the human and physical resources needed in the construction process can be effectively reduced, and more importantly, the cost of the construction works can be reduced, and the construction cycle can be greatly reduced. However, the traditional civil engineering construction is relatively designed drawings for inspection and analysis, as long as the design drawings are reasonable and scientific data are not problematic, it can be qualified. Finally, the acceptance of the quality of the project requires the staff to go to the field to inspect and visit, and compare the drawings. But these tasks are done by the staff themselves, and the workload is relatively large, in this case, there will inevitably be some mistakes in the work, the results are not so accurate, nor is it very reliable, and BIM technology can make up for this defect very well [10]. As already mentioned above, BIM techniques can be used for remote management and control of the construction site, and corresponding building models can be
formed according to the actual construction conditions, and then the architectural design drawings are compared. This method is compared with the traditional quality tests, and it can be found that the workload of the staff is greatly reduced and the accuracy of the work is higher.

4.2 Construction drawings can be further designed

Although the design drawings of civil engineering are also presented by designers after a long period of consideration and after testing by various responsible persons, and most of the civil engineering projects are relatively large, complex and difficult, plus the actual construction situation and the surrounding environmental problems, so the design drawings are generally changed many times, and the traditional drawing design scheme has become a bit backward in modern times. The visual features of BIM technology can directly show the final design effect of the designer's ideas and the design scheme of the building engineering in the form of three-dimensional architectural models, and the specific details of the three d models in the design scheme can also be clearly seen. This method can be effectively solved. Unreasonable areas are found in practical projects, rework needs to be improved, time saving can be effectively saved, materials will not be wasted, and most importantly, the architectural models designed by BIM technology can be magnified or reduced at will, This is very helpful for staff to test parts of different areas during construction [11]. You can even observe whether the building meets the needs of people in life, or whether it has a certain impact on people's daily life, because the overall drawings and drawings of the building project are presented in three dimensions.

5. Conclusion

BIM the emergence of technology, the efficiency of civil engineering construction has been developed and improved, and more importantly, this technology can promote the final quality level of civil engineering has also been developed. BIM technology has promoted the development and reform of the whole construction industry in China and made Chinese technology better and better.

References