Application of BIM technology in safety management of construction engineering

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Abstract. In recent years, my country has made great breakthroughs in technical construction technology. BIM is a new technology that has emerged [1] The most emerging solution has solved the role of safety management in construction projects. In the process of construction engineering, safety management bears the brunt of construction safety. It all depends on how well its foundation is built. However, for the safety of construction engineering, China still has a higher defense against BIM technology. It is just from a planning design. From the construction to the management stage, a unified and coordinated process. In order to better realize the construction project, the BIM technology is adopted, which seems to be a simple 3D 4D file. In fact, BIM is not only convenient to use, but also extremely safe. The building information model is used by the digital building director to express that the construction of buildings in the world is simpler and more convenient than the traditional design for the use of traditional computer-aided design. Compared with traditional design, BIM can provide accurate information. Responsibilities of each participant of the project during their respective operation and work, responsible for the information they possess to add reasonable application of this building information model.

Keywords: Digital Technology Application, Safety Management, Construction Engineering

1. Introduction
The emergence of BIM has a greater manifestation in my country’s architectural design. For example, when the construction documents are accurately communicated to everyone, their needs are produced in terms of drawing requirements, detailed environment, submission procedures and other buildings. Documents related to item specifications, each of which is accurately implemented in the hands of everyone. Each BIM component serves as a single unique element of the architectural form. When loaded into the project model, the appearance of the structural framework BIM between his own ideas and other elements facilitated the use of construction buildings in my country as a relatively rapid method. He will be more open and diverse than the original structure, and he will enable the system body to jump out of many relevant prompt messages, thereby helping people to achieve their goals faster. BIM technology can quickly reduce the implementation time of workers while planning the
data model of each participant, and can also pass through many structures such as walls and windows. The most intuitive feature of BIM lies in the three-dimensional visualization, which reduces the error of image recognition. Use BIM The 3D technology of bai conducts collision inspection in the early stage, intuitively resolves spatial relationship conflicts, optimizes engineering design, reduces possible errors and rework in the construction phase, saves engineering costs and construction time, and improves engineering efficiency.

Figure 1. BIM introduction

2. Benefits of BIM technology application

2.1. Introduction to BIM

Building Information Modeling (Building Information Modeling, BIM for short) is a unified and coordinated process from planning, design, construction to management. It is an operating software that converts standard concepts into corresponding data. Ideally, the BIM process uses centralized digital 3D modeling as the core resource. BIM images seem to be simple 3D CAD files. In fact, BIM components are more complex in the application and provide better operational flexibility. When creating a single component, each BIM component acts as a single unique element in the architectural form. When loaded into the project model, it allows users to see the relationship between the component and other elements; for example, the revolving door of Doma Load the model to a single measurement.

Figure 2. BIM use process

2.2. BIM construction application

Regarding the BIM projects on the market, many companies introduce BIM and then enter the application program to enter the project application to solve the contradiction between the enterprise and the project. The enterprise generally starts from the direction of enterprise development and is a new field promoted by the company. This guarantees the competitiveness of the enterprise. The competitiveness of the enterprise is a double-edged sword, both good and bad. The project’s goal is
clear and quality is guaranteed, while at the same time controlling the increased cost of revenue and its purpose is clear. There are two contradictory relationships between the projects. The company provides support for BIM in computer applications and human resources, and the engineers on the project develop free training and strengthen. Increase motivation. The implementation of BIM attaches great importance to the problem of personnel coordination. In fact, the team members of BIM come from different fields or even different companies. The working time of personnel is a huge problem, and it is difficult to ensure that employees use time coordination. The personnel have complete leadership, not only to ensure the working hours of the main staff, but also to ensure the completion rate of the project. This must greatly improve the enthusiasm of the staff. In order to avoid out of line production, the phased results during the project use period must be communicated in time, and the BIM application project must be clearly used to the two lines of construction with the purpose, and finally achieve a win-win effect.

2.3. BIM is a double-edged sword
The current foundation and status of BIM applications on the market cannot be overestimated, but the development speed of BIM cannot be underestimated. Both the builders and other participants should rationally view the bright future of BIM. The road is tortuous. There are many problems with the integration of software, many problems with inconsistent standards, and many problems with lack of talent. Due to the current construction engineering system, everyone's enthusiasm for the application of new technologies is uneven. Regarding the use of BIM and the key to the intermediate implementation path, as long as everyone cooperates with each other, the prospect of BIM is immeasurable, but BIM is rarely used. How to use BIM correctly. BIM is the best to use, and the most easily noticeable benefit should be the application of load-bearing objects. BIM can make engineering more accurate and faster, and save time and effort. It can first know the problems that occur, so that each worker can implement each other more smoothly. So that deriving construction drawings from the model can reduce the error rate on site and increase the speed of the constructor. BIM technology has the characteristics of visualization, dynamics, coordination, simulation, etc. [2] In order to accelerate the use of BIM, my country has made a significant contribution to the cultivation of scientific and technological talents.

Table 1. Applicability of BIM

|          | Tier 1 cities | Tier 2 cities | rural |
|----------|---------------|---------------|-------|
| general  | 24%           | 56%           | 45%   |
| good     | 73%           | 21%           | 31%   |
| difference | 3%            | 23%           | 24%   |

2.4. Benefits for engineers
BIM is a new technology [3]. For engineers, the biggest problem for its implementation is to reduce disputes. Before BIM, architects discussed plans with residents. Using only design drawings would have many communication flaws. There are many problems in understanding. In addition, the design drawing has insufficient detailed information for the parameters, causing many unnecessary disputes. However, the three-dimensional information model generated by BIM can replace all the designs with numbers, and the content formation will become another Alternative, this can strengthen mutual discussions between the two parties, make it more transparent, and reduce the time wasted by engineers in the middle of making design, and it can also reduce the chance of modification on the way and reduce safety issues. [4] This strengthens the user's confidence in the protector.

Generally speaking, the work of architects and civil engineers is to do their own work. The division of structural fields is relatively clear. They always wait for the matter to progress to a stage before discussing. This will not only inconvenience the connection of work, but also cannot talk about personal ideas anytime and anywhere. To discuss it, if there is a problem with the two pictures
together, it takes time to modify, but if you use BM, then the architect and the civil engineer can communicate on the same platform, and use the same model and common language for dual methods. Explore. This work can enhance the compatibility of the entire team, not only can achieve good communication, the overlap between the majors is clear, and the professional conflicts can be reduced. This can also avoid many drawbacks in the design and reduce safety problems [5], thereby enhancing the construction time. Speed can be more perfectly integrated into the needs of the owner, so that the building becomes more reasonable and more commercial and digital.

![Figure 3. BIM process](image)

**Figure 3. BIM process**

### 3. Disadvantages of BIM in the market

The market recognition of BIM is low, especially for people in architecture. The 2D working mode has brought many drawbacks to the project. For example, real and effective data analysis, the transmission between various links is not timely, etc., but it has been used by people for decades. Either way, for the industry or for the enterprise, a set of problems that solve the traditional construction model has been summed up. Although these methods are flawed, the risks and costs brought by the BIM reforms to be applied have to be reduced by a lot, so that many people still insist on using the CAD working mode, and some owners or designers are more concerned about There is not enough understanding of how big the market and benefits the application of BIM can bring, so the market recognition is low.

The benefits and costs of BIM have not been well applied or evaluated by the market and there is no way to try it. For many people, it is difficult to implement BIM in the entire business chain. At the same time, the short design cycle of projects in our country generally exists in the problem of project entry time. The designer does not have enough time to verify how much BIM can bring to the design [7]. There is no time to arrange relevant personnel to conduct special BIM training, BIM The degree of localization of the software is relatively low, because 3D design needs to have a certain dependence on the building component elements, and BIM software is an object-oriented foundation, which is developed for foreign countries. The research on this project is early, so BIM software is said to be From the application to the level of development, it is much lower than that of foreign countries [8].

### 4. Conclusion

The emergence of BIM breaks the conventional design method. BIM construction and application breaks the conventional 2D mode and can effectively improve the effect [9]. It is worthy of application and promotion. For many groups using BIM, the degree of construction has been significant. Improvement, including the designer’s self-awareness of design methods. This breaking-the
conventional design concept is worthy of our promotion and learning, so that companies can participate in it and truly feel the changes that BIM brings to construction projects. [10].

References
[1] Zhao Fei, Shen Haihua. The application of BIM technology in the safety management of construction projects[J]. Modern Property Management (Mid-term), 2018(07):71-71.
[2] Cao Kun. Thoughts on the application of BIM technology in construction safety management[J]. Metallurgical Series, 2017, 000(001):146-147.
[3] Li Tong. Application of BIM Technology in Construction Safety Management% Thoughts on the application of BIM technology in construction safety management[J]. Value Engineering, 2018, 037(003):27-28.
[4] Xu Hua, Zhou Guixiang, Jiang Fengchang, et al. Application of BIM technology in safety management of engineering construction% Application of BIM technology in safety management of engineering construction%[J]. Jiangsu Science and Technology Information, 2018, 035(007):49- 51.
[5] Ren Guozhi. Application of BIM Technology in Construction Management% Application of BIM Technology in Construction Management[J]. Intelligent Building and Urban Information, 2018, 000(004):67-68.
[6] Wang Xiangming. Discussion on the application of BIM technology in the electrical design of construction project% The application of BIM technology in the electrical design of construction project[J]. Fujian Architecture, 2016, 000(007): 102-104.
[7] Sun Xiaoli, He Jianwu. Application of BIM technology in the construction of a general contracting project management% Application of BIM technology in a project management[J]. Journal of Qingdao Technological University, 2017, 038(001):125-129.
[8] Yang Yang, Zhou Xin, Cai Ming. The Application of BIM Technology in a Decoration Project% Application of BIM Technology in a Decoration Project[J]. Journal of Nantong Vocational University, 2018, 032(001):100-104.
[9] Tian Yapeng, Kang Xiaohui, Qiu Xiaohui. Application of BIM Technology in Hospital Construction Project Management% Application of BIM Technology in Hospital Construction Project Management[J]. Chinese Hospital Construction and Equipment, 2019, 000(007):75-76.
[10] Shen Yi. Research on the application of BIM technology in project construction management [D].

