



Application of BIM+ Smart Site Integrated Construction Technology in Large Medical Building Construction

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Abstract. In order to explore the application of BIM+ smart site integrated construction technology in the construction of large-scale medical buildings, through the analysis of the basic situation of the current large-scale construction engineering construction, it can be found that BIM Technology, smart site and other technologies have a lot of applications in the current construction engineering construction, and the application effect is good. It is necessary to continue to strengthen the application in the subsequent project construction to improve the value of engineering construction. Based on this, this paper takes the large-scale medical building project as the research object, and makes an in-depth study on the key points of the application of integrated construction technology based on BIM+ smart construction site in the process of engineering construction, hoping to provide effective guidance for the application of integrated construction technology for the subsequent high-quality and efficient construction of large-scale medical buildings in more places.

Keywords: BIM, Smart, Construction site, Comprehensive construction technology, Large medical building, Project construction, Efficient construction, Construction management, Collision detection

1 Introduction

BIM Technology is one of the most commonly used technologies in construction management. It can simulate the construction process. First of all, collect the data related to the project and enter it into the database. The computer program simulates the parameters and processes. The virtual model can be correlated and compared with the actual progress. The collision detection can be carried out and the design scheme can be optimized and adjusted before construction. Project managers can control the whole process of project construction, avoid various risks and conflicts, effectively reduce construction costs, shorten the construction period, save resources, improve the quality and efficiency of project management, and better practice the concept of green, efficient and low-carbon development [1]. Based on this, this paper takes the large-scale medical building project as the research object, and makes an in-depth study on the key points of the application of integrated construction technology based

on BIM+ smart construction site in the process of engineering construction, hoping to provide effective guidance for the application of integrated construction technology for the subsequent high-quality and efficient construction of large-scale medical buildings in more places.

2 Application point of BIM+ intelligent on-site comprehensive construction technology in large-scale medical building engineering

The large-scale medical building engineering management platform, which integrates BIM Technology and the concept of smart site, includes intelligent monitoring system, Internet of things management system, environmental monitoring system, project construction management system and other systems [2-3]. Its core is the BIM engine. The construction information model, video monitoring equipment and other contents can be processed in three dimensions. The project construction management personnel can comprehensively and effectively grasp the project construction progress, specific construction conditions and problems from the platform. After the real-time feedback of the project construction information, the staff can analyze and study various information, so as to find and reasonably avoid the project construction risks, so that the project construction unit can make correct construction decisions during the project operation, and ensure the normal and orderly construction of the project, as shown in Figure 1 is the definition of BIM [4].

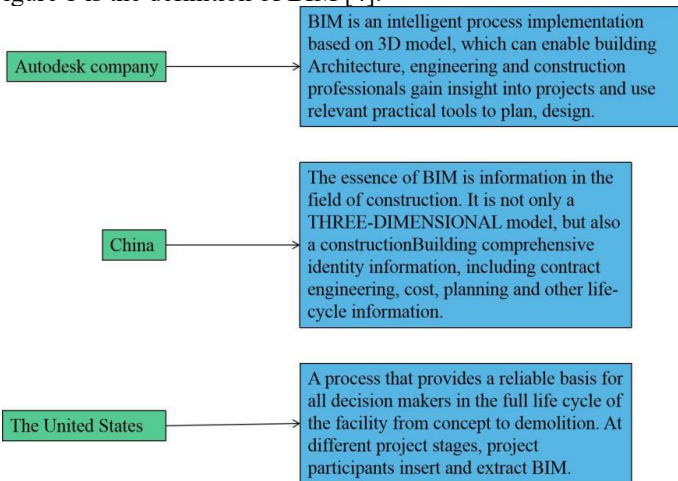


Fig. 1. Definition of BIM

2.1 Quality management

During the construction of large-scale medical building projects, it is necessary to establish a remote video monitoring system, so that the construction management unit

can access the monitoring of each construction area in the system platform, and comprehensively judge and analyze the construction situation, construction resources and equipment utilization of construction personnel through playback, export and other operations [5]. If it is determined that the construction personnel have construction problems, the management personnel can find the corresponding person in charge of the construction content in time to properly deal with the problem at the first time. Among them, the construction quality management of engineering projects is a key content in the overall engineering construction. When carrying out engineering quality management in the platform built by using BIM+ smart site integrated construction technology, managers need to do the following work: The construction management personnel of large-scale medical buildings need to observe and analyze the construction situation of the project through the monitoring system in the management platform. During this period, if construction problems are found, they should contact the construction personnel as soon as possible, guide the construction personnel to optimize the treatment of construction problems, and ensure that the construction quality of the project meets the requirements [6]; Moreover, the management personnel should regularly summarize and analyze the construction information obtained during the work of the management platform, find out the construction quality risks in advance, and inform the construction personnel in time; In addition, it is also necessary to track and investigate the specific existing construction quality problems during the treatment period, and arrange special personnel to supervise and manage the construction quality change operation. If the subsequent construction change work has quality problems, the relevant management personnel can be held accountable, which can significantly improve the overall quality of construction engineering construction [7-8].

2.2 Safety management

During the supervision and management of large-scale medical construction projects, the management platform built with BIM Technology and smart site concept needs to carry out closed-loop safety management of the project, that is, managers need to carry out overall safety inspection and management of the project engineering situation [9]. Once a safety risk occurs, a rectification notice will be issued at the first time, so that the construction personnel can deal with the construction problems in a timely and effective manner at the construction site, and then review and analyze the construction safety rectification of the project. After inspecting the operation site and there is no corresponding potential safety hazard again, continue to carry out safety patrol on the construction site, so as to supervise and manage the construction safety of large-scale medical building projects in the process of this cycle, reasonably and effectively avoid construction safety risks, and build a safe construction environment for construction personnel [10-11].

2.3 Progress management

During the management and control of project construction progress by using the management platform formed by BIM+ smart site integrated construction technology, the construction unit of large-scale medical construction project needs to plan and analyze the project construction progress in advance, divide the project into different construction contents, and formulate the construction schedule [12]. Managers can compare and analyze the project construction schedule and the actual construction progress in the system. If there is a big difference between the two, it is necessary to study the actual construction progress [13].

2.4 Cost management

When carrying out cost management and control during the construction of large-scale medical buildings, managers need to input the type and quantity of materials used in the construction of the project, as well as the daily construction utilization quantity, inventory and other information into the management platform to track and investigate the daily use of materials throughout the process [14].

2.5 Environmental management

During the construction of large-scale medical building projects, more mechanized equipment will be used, so more dust and noise will be generated, which will seriously affect the natural ecological environment near the construction area of the project and the normal life of residents. Therefore, it is necessary to use BIM+ intelligent integrated construction technology management platform to conduct real-time monitoring and management of the project construction environment [15]. If the noise and dust content in the air exceed the standard requirements, sprinklers and noise reduction devices should be actively used to deal with it, so as to minimize the harm caused by the project construction to the surrounding environment, so that the project can be successfully completed. The comparison of insulation materials is shown in Table 1. According to the characteristics of materials and local climate and temperature, high-efficiency rubber and plastic sponge insulation is finally selected. At the same time, air handling equipment with good air tightness and air duct connection mode are selected to strengthen sealing treatment and reduce energy loss [16-17].

Table 1. Comparison of different insulation materials

Material name	Material characteristics	Applicable temperature
Glass wool shell	Widely used in refrigeration equipment, thermal power wire insulation	$\leq 454^{\circ}\text{C}$
Rock wool shell	Used for insulation of various pipelines in petroleum, industry, electric power, etc	$350^{\circ}\text{C}\sim 600^{\circ}\text{C}$

Rubber plastic pipe shell	Durable, economical, soft and convenient	40°C~120°C
Aluminum silicate shell	Applied to high temperature pipes of electric boilers	≤1000°C
Polyurethane shell	Aluminum silicate tube shell substitute, low cost	40°C~800°C
Silicate shell	Used for insulation of underground pipelines with strong cold resistance	-196°C~120°C

2.6 Human resource management

When managing human resources during the construction of large-scale medical buildings, we can use the labor real name management system in the management platform based on BIM+ smart site technology. That is, the management personnel can use this system to investigate and understand the basic information of the on-site operators, arrange the construction work according to their own construction ability for each construction personnel, ensure that the construction personnel can complete the project construction work with quality and quantity, and avoid the recurrence of the project construction quality problems caused by the poor ability of the construction personnel [18]. There are mainly 8 types of software involved in project management during the construction process. See Table 2 below for details [19-20].

Table 2. Leading software and its application

Software name	Main applications
BIM5D	Integrated application software integrating multi-disciplinary model, schedule and cost information
BIM drawing review	Free comprehensive collision review
GYF2014	Construction turning tools
BIM browser	Free model integration browsing tool
BIM calculation	Calculate quantities quickly and accurately
Magi CAD	Preferred for electrical, ventilation and air conditioning Majors
Construction site layout	Intelligent 3D layout software for construction site

3 Conclusion

BIM Technology + smart construction site has been widely used in various large-scale engineering construction. Aiming at the characteristics of complex structure and cumbersome professional construction of large-scale construction projects, it can significantly improve the management efficiency of engineering projects. By using three-dimensional modeling, Internet of things, big data analysis and other technolo-

gies to process the construction process and data, we can realize intelligent and active management of the project's structural design, quality control, schedule, safety supervision, human resources, capital plan, environmental monitoring, etc., and play a role in improving the quality and efficiency of project management.

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