Research on the Application of BIM Technology in the Efficiency and Effectiveness of Construction Project Management

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Abstract. Construction engineering is a very complex system engineering project, which will be affected by many aspects. Therefore, construction project management often delays the cycle, which has become the main problem of project management. BIM Technology has been very mature, which has become the basic software of construction project management. Through BIM Technology, we can master the whole life cycle of construction project, which will improve the efficiency and effectiveness of project management. Firstly, this paper analyzes the efficiency and effectiveness of BIM for project management. Then, this paper analyzes the application of project management based on BIM.

Keywords: BIM Technology, Construction Engineering, Project Management

1. Introduction

The first mock exam is BIM, which is a new technology combining mathematical modeling thinking and software information. It can simulate information, data, parameters and morphology of building engineering. Through BIM Technology, the construction project can better build the construction information, project information and cost parameters, which is an information sharing platform based on IFC, IDM and IFD standards¹¹. By connecting the software of each stage, we can connect all the information of the project, which will quickly realize the shared value. At the end of the 20th century, construction project management will be limited by various factors, which will seriously delay the cycle of project management, which will seriously affect the progress and quality of the whole construction project. With the use of BIM Technology, the efficiency and effectiveness of project management gradually improve, which has become the main tool for coordination and cooperation of the whole
project. Through the project management model, we can intuitively and comprehensively analyze the construction project management, which will provide strong technical support for project management[3].

2. Efficiency and effectiveness of Bim in project management

2.1. Timely update database information

In the actual construction project, the amount of project data information involved in project management is very large. The traditional method is the management and integration of paper materials to data information. BIM Technology is information data management, which improves the efficiency of project management. Through BIM Technology, we can effectively integrate data information. Through the establishment of BIM voucher, we have improved a series of problems in the past project management, which comprehensively collected and integrated data from all aspects and links. Through the establishment of BIM data platform, we can update all data in time, which realizes the accuracy and validity of data. Through BIM Technology platform, we have changed the previous project management mode, which promotes the sharing of resource information.

2.2. Improve the accuracy of quantities

In the traditional project management, the project manager will record the allocation of funds and materials in each link of the project according to experience, which will not guarantee the scientficity and rationality of the work. Through BIM model, we can scientifically allocate and arrange data information for various applications. Through the 5D mode of BIM, we can analyze the actual situation of engineering construction, which will arrange the actual engineering construction more accurately. By improving the accuracy of engineering quantity, we can reduce the error in engineering construction, which will improve the rationality of building resource allocation. By ensuring the accuracy of the engineering quantity data, the project manager can modify the BIM model according to the actual situation, which will save a lot of time[3].

2.3. Realize dynamic management

By building the 5D model of BIM, the project manager can imagine the dynamic management of the project. Through 5D model, we can input abstract data information based on set model, such as construction period, cost input, project cost range, etc. Through the 5D model of BIM, the project manager can carry out dynamic management on the project management, including the number of personnel, resources, infrastructure, capital investment, etc., which will arrange the allocation reasonably.

2.4. Convenient data accumulation and sharing

Every data and information in engineering construction is a reference. In the process of engineering construction, the project manager can refer to the previous construction information, which will accumulate a lot of valuable knowledge and experience. But in the past engineering construction, the construction unit did not pay attention to the role of building data, which will result in low efficiency of data application. Through BIM Technology, construction engineers can use modern information equipment, which will realize information sharing. Traditional project management is a separate mode
of work\cite{4}. By building BIM model, we break the separation mode, which will make the project management data information be integrated in an all-round way. By forming a good data link, we can provide technical support. Through BIM Technology, we can achieve data accumulation and sharing, which will ensure the construction efficiency of the project.

3. Project management application of BIM Technology

3.1. BIM progress management framework

Project schedule management is not isolated. BIM Technology brings great value and convenience in the whole life cycle, which will ensure the effective communication of information. Only by integrating information technology can we build a BIM based progress management system, which can eliminate the disadvantages of traditional information creation, management and sharing. We can improve the efficiency of project management by realizing the informatization of project schedule management. The BIM based progress management application framework is shown in Figure 1.

![Figure 1. The BIM-based schedule management application framework](image)

3.2. Application of schedule analysis
In the analysis of schedule and construction period, we should review the consistency of major milestones, which will ensure whether the period is consistent with the contract period. By looking for the critical path, we can analyze whether the working duration on the critical path is acceptable. In addition, under the condition of comprehensive consideration, whether the commencement milestone and completion milestone meet the project requirements. Through the multi-party development of the completed hierarchical plan, we can analyze and check the plan after the summary. Therefore, project participants should communicate\cite{5}. The project analysis schedule is shown in Figure 2.

3.3. Management objective plan

After analyzing and adjusting the project plan, BIM Technology achieves the balance among scope, schedule and cost, which will be considered as the project management objective plan. Project jobs define progress information such as the earliest and latest start time, which can provide multiple target plans. Therefore, BIM Technology is more conducive to schedule analysis. The objective plan of the project cannot be unchanged, which will change with the progress of the project. After tracking the project progress, we will find that the deviation between the target progress, which will lead to the loss of value of the original target plan\cite{6}. Therefore, the project manager needs to recalculate and adjust the target plan, which will automatically calculate the adjustment and form a new target plan, as shown in Figure 3.

4. Conclusion

BIM Technology has become the mainstream of construction industry development. The application of BIM Technology can effectively improve the efficiency and accuracy of management work and promote

![Figure 2. Schedule analysis by 5D simulation](image-url)

![Figure 3. Screenshots of construction schedule simulation tracking](image-url)
the development of construction information. BIM Technology Information Platform can build a simple model. By inputting the relevant data and parameters of the construction project, we can quickly generate and retrieve the relevant information, which can calculate and compare different schemes. By choosing the best decision-making scheme, we can provide data support for future construction project management.

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