

Research on the Synergy Mechanism of Project Management Based on Bim

Haotuan Dang

Xi'an Aeronautical University, Xi' an, Shaanxi, 710077, China

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Abstract: Building Information Modelling (BIM) is a modern information technology platform that can realize the design, construction and operation management of construction projects by creating and using digital models. It is integrated, intelligent, digitized, and model information. The relevance and other characteristics have created an information platform that facilitates communication for all parties involved in construction projects. In recent years, BIM technology has received increasing attention and practical application in the domestic construction industry, and has provided effective modern information technology support for the research and exploration of new construction project collaborative management models and related systems and mechanisms. This selection of “project management coordination mechanism based on BIM technology application environment” for targeted research has important practical significance and value.

1. Introduction

With the continuous development of my country's economic strength, the number of large-scale construction projects is currently increasing, but with it, there are some resource waste problems, construction quality problems, and construction delays in the construction process of some large-scale projects. Problems are gradually exposed, and the emergence of these problems is often related to the poor communication and coordination of various departments in the process of project management. This problem is also a situation that practitioners in the construction engineering industry are trying to change. , But due to various factors, the solution of this problem has not improved. With the emergence of BIM technology, a new direction is provided to solve this problem. The article specifically talks about some of the roles that BIM technology can play in the ancient city.

2. Characteristics of China's Large-Scale Engineering Construction

As the pace of modernization in our country continues to accelerate, in terms of construction projects and this industry, the number of some large-scale construction projects is increasing. For example, in the construction of railway projects, in 2008, the Ministry of Railways of my country re-adjusted the long-term planning of large-scale railway networks, and formulated the ambitious goal that my country's railway mileage will exceed 120,000 kilometers by 2020. This also means

that in the next few years, the amount of engineering my country's railway construction will face is very huge. During the construction of the railway network project, the construction design work of the project will directly affect the final construction quality. At the same time, different construction schemes will have a great impact on the construction phase of the project and the subsequent completion and acceptance phases. However, as far as the project construction plan planning is concerned, it requires the participation of most departments of the project participants to provide different views and suggestions for the design of the project construction plan, and this is precisely the problem of many large projects. The main reason for the problems in the process of construction plan design. Due to the large construction scale of the project, there will be a large number of departments involved in the construction plan. These units or departments often have different requirements or interest appeals for the specific construction process of the project, and these requirements are due to Too much quantity will inevitably lead to conflicts. At the same time, due to the slow transmission of information, the modification of the construction project has caused a lot of trouble. This is also one of the main reasons for the difficulty in the development of the construction plan. At the same time, in the process of engineering construction plan design, due to technical constraints, the information based on the plan design process is basically derived from some two-dimensional drawings of engineering construction. This situation leads to two problems: (1) Extra workload is brought to the design of the construction plan. Due to the large number of units or departments involved in the construction process of large-scale construction projects, and all of them require engineering Drawings are used for engineering design. In the final construction plan formulation work, these drawings need to be consolidated and processed in a unified manner, and the huge number of drawing summary work is not a simple matter. (2) The problem of the drawing itself. In the construction process of some small and medium-sized construction projects, the construction drawings used are often two-dimensional drawings. This is because the legibility of the two-dimensional drawings greatly reduces the difficulty of the monthly work of the drawings and improves the construction speed of the project. As far as large-scale construction projects are concerned, such two-dimensional construction drawings are undesirable. Due to the excessive number of construction projects involved in large-scale construction projects, there are more detailed issues that need to be addressed. Due to its limitations, it can not reflect the three-dimensional details of the project construction process well, which brings some difficulties to the actual construction work of the project. The BIM technology, due to its own technical characteristics, enables it to solve these problems in a targeted manner.

3. Design of Macro-Coordination Mechanism for Project Participants in Bim Environment

In the DBB construction project procurement model, the owner, the designer, and the contractor sign contracts separately. The designer is only responsible for the design and the contractor is only responsible for the construction. In the previous chapter, it has been mentioned that the design and construction of the DBB construction project procurement mode are separated, which is likely to cause a disconnect between the design plan and the construction conditions. The resulting design plan has poor constructability, high frequency of design changes, poor construction enthusiasm, and long period. For problems, the owner undertakes the main coordination work. Therefore, in DBB construction project procurement mode coordination is mainly completed by the owner. The owner communicates with the designer and contractor respectively. In the whole process, whether it is the design information transmission from the designer to the owner, or the information feedback from the contractor to the owner, the information The flow direction is single, the path is long, the communication time is long in actual implementation, and the information transmission is inaccurate, which leads to the delay and lack of information transmission. The single path of

forward transmission of information and reverse feedback determines that all information flows need to be reviewed and approved by the owner. Due to the lack of professional knowledge of the owner, the information stagnation of the owner caused the interruption of the entire project information flow. Therefore, the key to collaboration in this mode is to resolve the information communication between the designer and the contractor, subcontractor, and professional subcontractor.

The focus of the path design is: According to the division of engineering stages in China, the collaborative work under the DBB mode starts at the project planning stage, mainly involving the owner and the designer. The focus of the collaboration at this stage is: the designer fully understands the owner's project intentions and It is required to establish a basic conceptual model according to the relevant guidance of the shape, function, cost and schedule proposed by the owner; the preliminary design stage includes the deepening of the collaborative work in the conceptual design stage, and the cost, quality and duration of the project contractor Feedback; deepen the design stage, where the focus of collaboration is to detect conflicts between the information in the design model and the construction model to find potential problems; the construction drawing design stage is mainly to improve the final construction model, and quickly pass the BIM model Through standard review, the information requested by all parties is integrated; in the bidding phase of the project, the information of the construction party and the information of the designer are transmitted in both directions, and the information of the construction party is directly presented on the owner; the construction phase is displayed through a unified model to enable all parties to synchronize Understand the project progress and changes, and jointly serve the completion model; in the facility management phase, the owner will use the completed model information for subsequent management.

4. Design of the Micro-Coordination Mechanism of the Project Participants in the Bim Environment

The application of BIM was clearly defined when BIM was introduced in the project. During the implementation of the project, all parties involved need to perform their duties according to the needs of the application point. The micro-collaboration mechanism design in this section mainly refers to the work interaction path of all parties in the actual project, and combines BIM as the information collaboration platform to re-plan and define the work process of all parties. The following sections give a collaborative flow chart of change management, program simulation, and schedule simulation. The chart introduces the micro-coordination mechanism from the two dimensions of the occurrence stage and the participants. According to the implementation path of the BIM application in the project, first confirm the scope of the work content under the BIM application, determine the designed participants, formulate the implementation path, track the completion process of the task, and review the completed results.

Change management refers to changes to construction drawings proposed by the contractor during the construction phase. By introducing BIM in the change process, the feasibility of the change plan can be effectively verified and the risks that the change may bring can be evaluated. The BIM model is updated in real time with design changes, eliminating information transmission barriers, reducing information transmission and interaction time between designers and owners, supervisors, and contractors, so that claims visa management is more time-efficient, and changes are dynamically controlled and orderly. management. Calculating the amount of changed engineering through the BIM model can effectively prevent the contractor from changing at will and provide a data basis for change settlement. This mechanism designs the collaborative work of all parties in accordance with the overall approach from proposal to completion of changes in actual

engineering projects. The change process is divided into proposal change, demonstration change, and change implementation. Change management mainly includes three parties: contractors, owners and designers. According to the PDCA cycle strategy, the general construction contractor submits a change application, which is verified by the BIM model and submitted to the owner and designer for joint review. If the review is passed, the designer changes the drawing, and the owner performs the change estimation and other work. The contractor updates the BIM construction model when the change is implemented.

The project management mechanism carried out in the BIM environment can ensure that all participants in the project can understand the construction status of the project in real time and make adjustments on the model. At the same time, due to the particularity of the data model, it can ensure that these behaviors are The synchronization process greatly improves the coordination of the process. In the management process of some large-scale construction projects, the project can be carried out based on BIM technology from the planning stage to the completion and acceptance stage. In the construction project, each participant department or unit only needs to connect itself to the virtual platform constructed through BIM technology, and the construction model can be adjusted in real time. At the same time, due to the particularity of the virtual information platform, the construction information of the construction project can be quickly exchanged. Through the adjustment of the virtual digital model, these different construction plans are collected and integrated, and the different results on the digital model are displayed. To filter out the most optimized construction plan, and carry out the construction according to this plan, to ensure the construction efficiency and the reliability of the construction quality.

5. Conclusion

The collaborative work of project participants in the BIM environment is one of the important methods to improve the information closure of my country's construction industry and improve the efficiency of project management. The author of this article believes that the current collaborative research in my country's construction engineering industry under the BIM environment is still in the initial stage. The collaboration under the BIM environment mainly focuses on the construction of the collaborative framework of the IPD construction procurement model, and expands the collaborative discussion under the BIM environment to more projects In the procurement model, the value of BIM in construction projects will be better utilized. The application of BIM in the field of engineering project management is mainly reflected in the application of BIM in different stages of the project. The value of BIM application in construction projects mainly depends on the work of the project participants, rather than the operation and use of BIM software by a single participant . Therefore, in the collaborative work under the BIM environment, in addition to the overall collaborative work in the whole life cycle, the participation and collaborative work framework under the BIM application should also be included. Use BIM as a means of project management, not just test application.

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