

Application of BIM in construction engineering cost management

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Abstract

With the rapid development of China's construction industry, the scale of the project has also increased rapidly, and the design, construction and form of buildings have become more complex, which has led to the traditional construction methods of construction projects gradually failing to fully meet the needs of the new era. At the same time, higher requirements were put forward for project cost management. At this time, the new technology of BIM was introduced. This paper mainly introduces the advantages of BIM and its application in engineering cost management.

Keywords

BIM; construction engineering; engineering cost management.

1. Introduction

With the development of the economy, people are increasingly demanding buildings, and the formal structure of buildings is becoming more and more complex and huge. Construction enterprise units pay more and more attention to the management and control of project cost, and have a higher pursuit of the accuracy of cost. The original CAD and other software can no longer meet the requirements. At this time, people introduced a new technology called "BIM". People hope that this new technology can help the fine management of engineering costs. Due to the cost management of the construction project, it directly affects the construction time of the entire construction project and the quality of the completed building. Therefore, it is necessary to strengthen the control of the project cost budget[1].

2. The concept of BIM

Due to the advantages of BIM technology optimization, coordination and visualization, it has been widely promoted and applied in engineering construction[2]. In general, BIM can not only integrate digital information, but also help the application of digitization in all stages of engineering construction[3]. Moreover, due to the advantages of BIM visualization, once problems are found in the construction process, we can find problems in time, formulate corresponding solutions in the first time, reduce the impact and minimize the economic loss of the project, so as to fundamentally improve the overall effect of the project.

3. The advantages of BIM application in the engineering cost management

3.1 Data integration

The framework integrates building information modeling (BIM) with two different models; Monte carlo simulation optimization model is shown in Fig.1 BIM model represents building geometry information as the source of material data, such as quantity, life cycle data and sustainability data[4].

3.2 Data accumulation, Information sharing

BIM is the carrier of information management, and the information of people, things and machines of construction projects are stored in different categories. Managers can timely collect the latest man-machine price data through the information platform to reduce the cost of human and material resources, collect the data of completed projects through the information data platform, share the

structured information data in the building information model, serve the cost personnel and improve the efficiency of cost management[5].

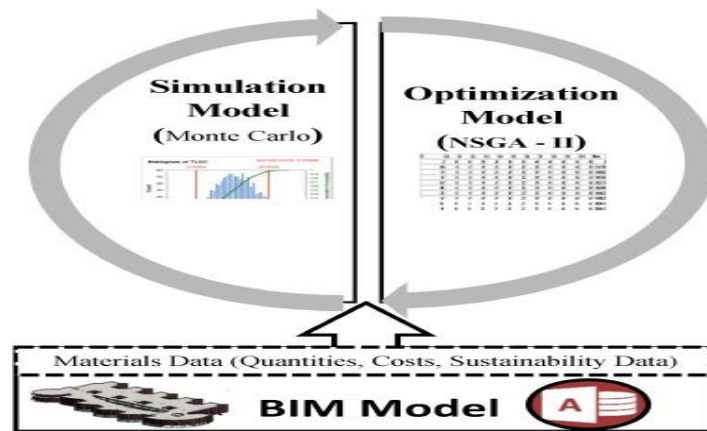


Fig.1 BIM and data integration

3.3 The advantages of visualization

Visualization of BIM, namely "what you see is what you get". Bim model provides a visual communication model, improves the efficiency of architectural design, construction and management communication, and elevates the three-dimensional model of the building to a new height. Compared with 3d models of 3DMax, sketchup and sketch masters, the advantage of BIM's 3d model is that it is a visualization and can realize the interaction and feedback between the same components. Although 3DMax, sketchup and sketch masters can also provide 3D models, they can only have 3D entity objects, lack of component information, and lack of interaction and feedback between the same components[6].

4. Application of BIM technology in each stage of project cost management

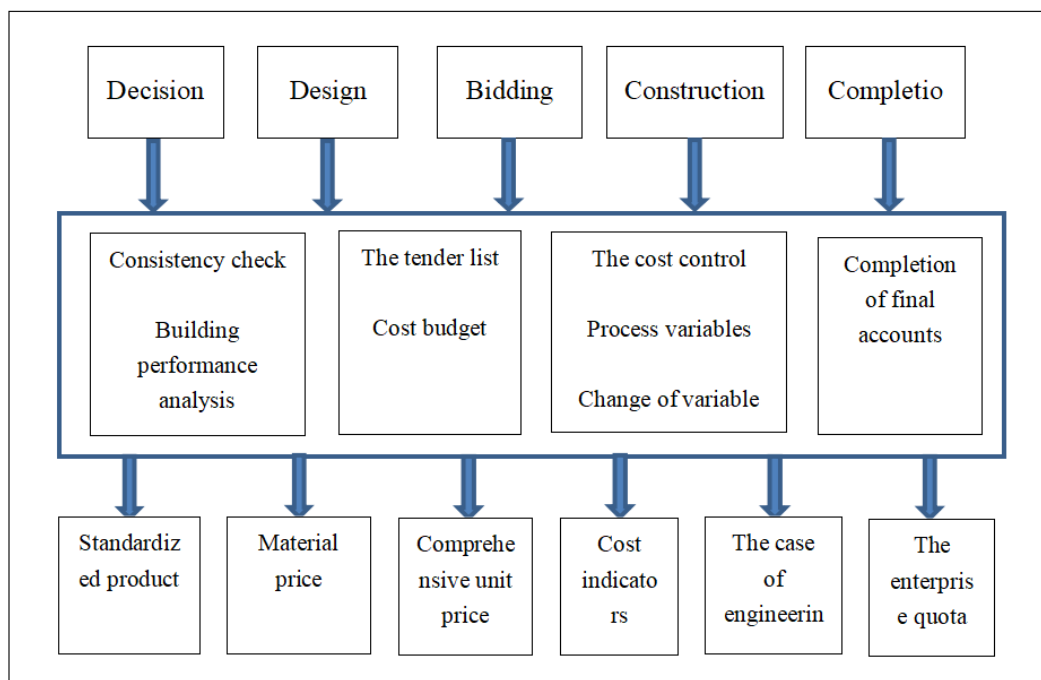


Fig.2 application structure chart of BIM in the whole process of construction project cost management

4.1 Decision stage

The design, bidding, construction and completion stages of engineering projects have different influences on the project cost management, but the decision-making stage has the greatest influence.

Therefore, economic and technical considerations should be taken into account to ensure the rationality and reliability of investment estimation[7].

4.2 Design stage

In the case of information sharing and timely update of BIM database, the data of the project will be saved by BIM to form a historical database, including various material indicators and regional indicators[8]. From construction drawing budget, construction drawing design phase to construction engineering design of the building, structure, and installation and so on various professional system integration on BIM technology platform, check each major conflict between system design and problems.

4.3 Bidding stage

Cost personnel can directly use the BIM model established by BIM in the design stage. In this way, cost personnel can use the BIM model to more conveniently and accurately collect project quantity information, avoid human errors and project omissions, and automatically generate details of the bill of quantities[9].

4.4 Construction stage

Use BIM parameters to quickly calculate the demand plan of related resources, reasonably allocate resources, including machinery, materials, personnel, capital planning, etc., and realize the balanced utilization of resources; Dynamic control of construction plan and construction schedule, interspersed with flow construction in the construction organization, to ensure the close integration of all processes; Develop detailed and accurate fund use plan to improve project quality and reduce project cost.

4.5 Completion acceptance stage

BIM model provides a lot of information for the investment decision, design and implementation of construction projects, so that the actual completion status of engineering projects can be accurately displayed[10]. The accuracy and comprehensiveness of BIM model information provide reliable information data for the final settlement, improve the efficiency of the final settlement, and effectively save the cost at the completion and acceptance stage. At the same time, BIM is used to compare and analyze the data of completed projects and establish relevant databases, so as to provide effective reference data for similar construction projects in the future.

5. Conclusion

Using BIM technology, all parties of the construction project can realize information sharing and improve work efficiency at all stages. Using the synergy and parametric function of BIM technology, the construction of project data information, convenient management personnel and technical personnel query the corresponding data, check the engineering information, to achieve the effective management of the whole process of the construction project. In addition, the application of BIM technology in cost management can effectively control the cost. In the whole-process cost management, using BIM to improve the cost control of construction projects, optimize China's cost management model, and promote the healthy development of China's construction industry. I believe that BIM will play a greater role in project cost management in the future!

References

- [1]Cheng mei. Application and benefit analysis of BIM technology in project cost management [J]. Value engineering, 2019, (2) : 9-12.
- [2]Zhang jing-ran. Bim-based refined management analysis of engineering cost [J]. Value engineering, 2018, (36):56-57.
- [3]Rao jie, Yu shanshan. Research on bim-based refined management strategy of engineering cost [J]. Jiangxi building materials, 2012, (03):200-201.
- [4] Mohamed Marzouk, Shimaa Azab, Mahmoud Metawie. BIM-based approach for optimizing life cycle costs of sustainable buildings.[J], 2018,(188):217-226.

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- [5]Gong dong, Kaohsiung, Ou xiaoliang. Bim-based whole-process cost management of construction projects [J]. China building materials science and technology, 2008, 101-102.
- [6]Wang xiaoqing. Application research of BIM technology in project cost management -- a case study of B3# office building reconstruction project of xiwan community phase ii, xiangzhou district, xiangyang city [J]. Industrial innovation research, 2018, (10):78-79.
- [7]Yang hongjuan. Bim-based refined management of engineering cost [J]. Green and environment-friendly building materials, 2014,14(05):47-48.
- [8]Xu zhuohua. Application of BIM in the whole process management of project cost [J]. Building materials world, 2016, (37) : 76-78.
- [9]Xu shengxia. Application value of BIM technology in project cost management [J]. China collective economy, 2018, (26):41-42.
- [10]Wang Juan. Research on the whole-process cost management and control of chemical construction project based on BIM technology [D]. Shihezi university, 2017.