

Research on Engineering Cost Management Based on BIM Technology

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Abstract. The application of BIM technology in the field of construction accelerates the construction industry to the rapid changes in information technology, and promote the level of China's construction to the height of the development of new technology, it can be said that BIM plays an important role in the construction industry. Construction cost is the most concerned topic of construction enterprises, and the development and application of BIM technology effectively solves this problem. The author makes some researches on the application of BIM technology in the construction cost.

At this stage, the application of BIM technology in China's construction industry has made remarkable achievements, but there is still a lot of room for development, and there are still many problems to be solved for the application of BIM technology. With the continuous improvement of science and technology, BIM technology will become more mature, in short, in the current rapid development of information technology under the guidance of BIM technology in the construction industry occupies a pivotal position, and taking BIM technology as the core of the construction industry to new heights of development.

Part One Overview of BIM Technology

The concept of BIM Technology

In recent years, with the development of information technology and the increasing popularity of computer technology, BIM technology rapidly developed a kind of new thinking and new method, it will project the whole operation process and related information together with the digital technology to the information into architectural drawings and presented to the people. The two-dimensional drawings are very common in the construction industry, and the technology of BIM makes the project more solid, clear and intuitive which shows a multi-perspective of architectural drawings for the people, convenient personnel timely response to the problems in the construction. BIM technology is also the real simulation of engineering projects, and plays a very important role in improving the efficiency and level of project management and reducing construction risk.

Characteristics of BIM technology in engineering cost management

Visualization. In traditional engineering projects, mostly flat drawings show each part of the project with the line form, which requires designers in the thinking of the imagination, but for some of the more complex projects, if only rely on artificial phenomenon exists in error, the application of BIM technology is based on vector graphic that will change into three-dimensional with the whole process of the image and the real simulation of engineering project, and it can realize the interaction and communication between the various components of the project.

2.Coordination. In any project, it is important to strengthen coordination and communication between developers and contractors. In the previous project, the event will mainly take the various units of the staff together to study and find out the root of the problem and then develop solutions, so the previous project has more attention to remedial, passive, and the cause of this problem lying in the early stage of the project developers and contractors are not effectively coordinated and communication. BIM technology has coordinated service, and it can coordinate and solve the problem in the early stage of construction.

Simulation. The use of BIM technology can be design scheme based on stereo image in the form of real project simulation, while even project drawings cannot display part of the drawing, such as

the design of fire protection system of buildings, and there are often more complicated lines, BIM technology can advance the complex circuit simulation to provide a variety of solutions as reference. At the same time, the optimization of BIM technology plays an important role in the cost management of construction projects in china.

Part Two Current Status of Construction Project Cost Management

The construction cost is difficult to realize the whole process control. Compared to the developed countries, China's construction industry is not high, and the development started late, and there are inevitably some areas to be improved. In the project cost management, is still lack of effective and systematic management mode, and some construction enterprises lack of the whole process control of engineering cost management consciousness, the relevant units or projects, such as construction units, reconnaissance units, supervision units, they have no negotiation and lack of unified thinking on engineering cost management, all the relevant units for its own interests that lead to "lack of coordination" situation in practical work with influence on the smooth development of project cost management.

Analysis of construction cost related data is not in place. Engineering cost data is the basic guarantee to ensure the smooth progress of cost management, and the accuracy of the data will directly affect the total cost investment of the project, which requires detailed and careful calculation and compilation. Generally, the construction cost includes three stages: budget estimate, budget preparation and settlement. The data produced by these three stages will play a very important role in the cost control of the project. But in the actual work, because each stage's focus is not the same, and there are differences in the results, while the lack of cost analysis and the related project itself, the project cost data and actual projects have serious discrepancy, each stage of data analysis is not in place, resulting in substantial waste of resources, and the project cost is not effectively controlled and management.

Project data can not be shared. Construction industry is a risky industry, but the cost information of engineering can not be integrated and shared in time, which is one of its risk sources. In the traditional construction industry, the project cost information can't be shared in time which will lead to the various stages of the project budget and actual cost to connect each unit to carry out construction and construction in accordance with their own ideas, eventually lead to confusion of information communication that is not smooth, and the main reason for above problems lies in the lack of a effective communication platform which will contact the every phase of project together, and the application of BIM technology can solve this problem effectively.

Part Three Application Analysis of BIM Technology in Construction Cost Management

Project cost management based on BIM technology is the construction industry in the new thinking, new ideas and new methods, it is effective to improve the project cost over budget issues, while ensuring the quality of the project, as the cost control in the reasonable scope to realize the maximization of comprehensive benefit of the project. The author analyzes the application of BIM technology in construction cost management as followings:

Visual operation of BIM technology in engineering cost management. The biggest lies in the characteristics of the BIM technology can realize the visual operation, the use of visual operation, the lines form a simulation of three-dimensional graphics so as to realize the whole process of project coordination and communication. The application of BIM technology in engineering cost management is the digital information and model together with a more intuitive three-dimensional image and digital symbol that will produce cost information displayed in various stages and links, and it can also query the relevant information, greatly improving the use rate of cost information. In the various stages of the project information and data collection, it can constantly improve the visualization of three-dimensional model, the project cost data for the transmission and sharing of information to facilitate. Generally, the visual cost information mainly includes project survey report, drawings, meeting minutes, equipment information and construction records.

Application in project investment phase. The accumulation and analysis of project related data is mainly used BIM technology and computer technology, the use of these data can provide important reference for developers in order to develop the best investment project and to control the cost of project plays an important role.

Application in the design phase. The design stage is the key link in the whole project cost management. The data shows that the cost generated during the design phase is less than 3% of the entire project, but the impact on the entire project is more than 70%, so we can see the importance of cost control in the design phase. In the past design stage, people mostly use manual calculation and valuation methods, and the use of 2D plane drawings has some difficulties in the design of cost management limits. With the application of BIM technology, combined with CAD drawings and integration, it will have cost and price into the design stage, and the cost management and control in a reasonable range can reduce the impact of unstable project cost. In the design phase, the use of BIM technology can be more convenient with fast query historical data, and analysis and modify the existing irrational factors which are conducive to improve the accuracy and reliability of project budget estimates.

Application in bidding stage. The construction units in the bidding stage must do the detailed engineering calculation, and this process requires a lot of manpower and extremely easy to larger workload errors or omissions, thus affecting the bidding smoothly. Using BIM technology, we can calculate the data quickly and accurately, and effectively solve the error problem caused by manual calculation. In the tender stage, the construction unit can file in the form of BIM to developers to increase the probability of winning, but also for the latter to provide important reference to the program design to reduce unnecessary costs.

Application in construction stage. The construction stage is an important stage of the project, and it is also an important part of the cost. The project construction time is long, and the construction market changes constantly, these factors will adversely affect the cost management in the construction stage. BIM technology has the visibility, simulation and coordination, in the construction project, it can give full play to its advantages, with reasonable cost control, it also can fully control the construction progress and problems.

Application in the completion stage. The project construction period is long, and some construction units and work on all aspects are not responsible which is easy loss of data in the stage of completion, to the completion stage smoothly impact, it can only shake out that brings great risks to the project. BIM technology can be all data information collection and integration and storage to ensure the integrity of the data, only through the three-dimensional model can refer to the relevant information to improve the efficiency of project settlement, avoid all kinds of contradictions and problems.

Part Four Development Prospect of BIM Technology in Engineering Cost Management

In the new situation, two-dimensional drawings and cost calculation software have been difficult to adapt to the rapid development of the construction industry demand even in the face of market competition out of the situation, but at this stage of the BIM technology is not perfect, the need to constantly improve and perfect combination of integration with multi-specialty characteristic calculation of the integrated method and the BIM model of the platform. One can ensure that the model complete integration and another convenient calculations can also be characteristic of separation making the model more intuitive and more rapid and convenient calculation to enhance the relevance of the data and to provide data support for project cost management.

In addition, Internet and data conversion between information can not be achieved in the BIM model, some of the projects can not be reused, such as the design phase of the model cannot be applied in the construction stage which needs to establish a new model, although some import quantity calculation software can realize the model, but it needs a larger workload that requires multiple integration. Therefore, data conversion and communication become an urgent problem for BIM software, and the transformation between different software and many professional and language families will become important trend in the development of BIM technology.

Conclusion

To sum up, the cost control is an important content of the construction project to achieve maximum benefits, BIM technology in engineering cost management is obvious to people, along with the development of the development of information technology and computer technology, BIM technology is the core of the construction industry that will become the inevitable trend.

Reference

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