Application of Energy Saving in Small High-rise Building Based on BIM Model

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Abstract: With the development of economy and science and technology in our country, the construction industry has developed deeply in all aspects. At the same time, BIM technology has begun to be applied in the construction project cost management. BIM technology is an innovative building modeling technology, which plays an extremely important role in the traditional construction engineering. BIM technology also provides strong technical support for architectural design work. New concepts, new ideas and new technologies have emerged in many fields of architecture.

1. Brief Introduction to BIM Technology

In recent years, with the rapid development of China's social economy, the construction engineering industry has also been rapid development. In the small high-rise residential buildings, but also with the continuous growth of the population, the development of more comfortable, environmentally friendly and beautiful. For the development of modernization and science and technology, the content, technical requirements and data information of construction are more complicated and complicated, and BIM technology is developed in this environment, and has been widely used in various construction projects, which not only reduces the number of tasks of designers, but also improves the efficiency and quality of architectural design work. Next, this paper will focus on BIM technology and BIM technology in the small high-rise office building design specific application of a brief analysis and exploration.

The informationization of construction products and production process can be realized by using BIM technology, so BIM technology has always played a great role in the construction cost, how to use BIM technology scientifically and reasonably has become the key problem that engineering enterprises need to consider. BIM technology has remarkable characteristics compared with traditional cost management, which are mainly manifested in :1. Through the application of BIM technology, the optimization of construction engineering will be greatly reflected, whether in special projects or project plans, can achieve the purpose of project cost management ;2. BIM technology can be freely converted into three-dimensional graphics, providing visual technology for engineering enterprises, helping enterprises to greatly enhance the effectiveness of cost management ;3. In addition to stereo graphics visualization technology, BIM technology can also model engineering projects, and the favorable information obtained from the building model will help enterprises improve the feasibility of management.

Therefore, the advantages of BIM technology make engineering project measurement more accurate, work efficiency more, provide guarantee for the effectiveness of engineering cost, so that enterprises can improve the management level of resource technology a lot, engineering enterprises can also improve the efficiency of many aspects, both fine management and scientific management are far more than traditional engineering management technology, BIM as a new technology, can even be said to be the best technical implementation method for accurate collection and effective control of engineering information, for engineering cost management to provide more effective management advice. If the technical features of the BIM are summed up, they are as follows:

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Figure 1 BIM technical features

2. BIM Technology's Remarkable Advantage in Contemporary Construction Engineering

The advantages of BIM technology are remarkable, and there are still many characteristics that can be applied in practical work in actual engineering cost. For example :1 information resources can be shared —— digital modeling technology can be realized BIM, a large number of building information can be developed towards digitalization, making information modeling more specific, and the platform that this technology can achieve is not only component, project information, but also information about construction cost can be included in it. Actually BIM the technology is to integrate and connect all aspects of the information in the project, so the digital model has greatly improved the convenience and efficiency of the project cost management, so that all the people involved in the project can share the data of the cost management according to their own process characteristics, and reduce the lag between the information flow. Work efficiency is improved —— when the parameters of engineering data information and automation are reflected in the BIM technology, it is possible to accurately calculate the amount of engineering-related work. After the automation is quantified, the staff's energy and time are saved, but the quality of work is not deteriorated by the decrease of time and efficiency, but makes the calculation more accurate. 3. One of the most remarkable features of the technology ——BIM increasing collaboration between different work is the efficient coordination of the work at different cost stages, the improvement of the overall cost management level of the project. Visual management makes the cost management work at different stages more coordinated and the promotion of management work more perfect. Application of BIM technology at different stages of the project is shown below:

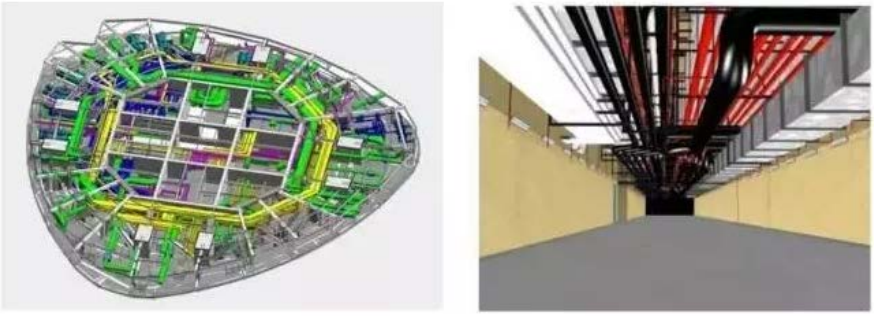

Figure 2 BIM technology

3. Energy-Saving Application of BIM Technology in Small High-Rise Building

3.1. Improved Environmental Protection and Reduced Consumption of Construction Resources

Generally speaking, as long as the unilateral pursuit of social and economic development, it is

easy to cause the environment to be polluted, how to protect our living environment at the same time of steady development is also a serious problem that our country is thinking about at present. To this, our country has put forward the national green environmental protection development idea. In order to better respond to this development concept, construction enterprises must reflect the energy saving, environmental protection, green and low carbon in the process of building design.

During the energy saving design of small high-rise office building, the BIM mode is mainly designed from the following three aspects: first, the building monomer energy saving. It is necessary to integrate the relevant information and data inside and outside the building, use the specific program mode, simulate and construct the circular energy saving system of the building, and then realize the effect of wall energy storage, building greening and cooling through green energy such as solar energy and natural wind energy; secondly, energy saving on the general plane of the building. The design team should make full use of the technical software to analyze the information data of the building, mainly to analyze and predict the actual internal and external environment of the building, adjust the building plane in the design process of the building, so as to achieve the purpose of energy saving; Finally, the base planning of the building is designed for energy saving. This energy-saving mode mainly uses the building environment to carry on the energy-saving treatment, also needs to use the technical software to carry on the analysis to the building environment. For example, in the design of small high-rise office buildings, we can apply the concept of sustainability design in BIM technology to design the consumption of building materials and resources. And in the process of design, we should pay attention to the protection of the surrounding environment, we can choose to use green building materials to reduce the pollution to the environment. At the same time, some ventilation systems can be set up, using natural wind to cool and ventilate the indoor, but also pay attention to the design of sunshine heat, low energy consumption, solar energy and automation mode to provide more convenient care mode for office buildings.

Figure 3 BIM technology

3.2. Construction and Design of Building Models

In building model construction, its component is the foundation of building engineering. BIM technology applied in architectural engineering design replaces the components in the building model with the corresponding digital code and turns the original digital models into three-dimensional models. From the present situation, most of the model construction is implemented by BIM technology after using building information parameterization. This technology is mainly based on the nature of the model components, functions of the building structure system, such as annotated symbol pixels, view pixels and so on.

In the construction of small high-rise office building, the first thing to do is to divide the model pixel area, and then set the parameters of each pixel, such as the material, structure, construction and elevation of pixels, etc. After the parameters are designed, the parameters are modified according to the actual situation, so that the building information is molded out, including the flat view of the roof, the three-dimensional view of the office building and the floor profile. In this way can be more intuitive to show the construction situation, for the construction of small high-rise

office building to provide a more realistic visual effect, better guarantee the quality of the building.

3.3. Optimization of Piping Arrangement

Pipeline layout is the most important part of the construction project, but also the foundation of later electrification, heating and drainage. Combined with the relevant professional technology, the BIM model will carry out collision test, when there is a collision problem, should follow: construction is easy to take refuge, small pipeline concessions to large pipeline principle. And through the early prediction of the problem, for the subsequent possible problems to prepare for the pipeline layout optimization.

4. Concluding Remarks

BIM technology for the construction industry is undoubtedly a new type of technology, it not only improved the shortcomings of traditional architectural design technology in the past, but also saved the resources of construction engineering to the greatest extent, but also based on different factors to consider the overall adjustment of the structure inside and outside the building, some special circumstances and phenomena, so as to design the best construction plan, promote the development of the construction industry, we also believe that over time, BIM technology will develop better in the future, will inject more vitality into the construction project. People's livelihood issues will also be properly resolved.

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