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Application of BIM Technology in Construction Safety Management

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Abstract: The skyscrapers of the 21st century are born, but the height is proportional to the difficulty of construction. The higher and the more complex, the more bizarre the ultra-tall buildings are, the more difficult the construction will make the construction site safety becomes uncontrollable. How can the maximum elimination of construction safety hazards? BIM technology offers a wide range of options for a wide range of engineering managers because of its advantages of simulation, predictability, dynamics, and monitoring, which can greatly reduce the probability of danger. This paper discusses the application of BIM technology in multi-dimensional space planning, safety guidance transparency, site danger prevention and isolation, virtual demonstration and simulation field, cloud safety inspection and risk location and prevention. The probability of occurrence of accidents, but also improve the efficiency of management staff.

Key words: BIM technology; construction; security; public management; VR technology

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0 Introduction

With the continuous improvement of economic technology, increasing urban construction, the increasingly diversified shape of buildings, ultra-high, more complex, different shapes such as building construction, making the site more difficult to increase safety management. This development has gradually received attention from the BIM technology has been applied and developed, and technology is becoming more and more mature. Because BIM has the advantages of visibility, dynamic simulation, morphological simulation and good information coordination, it can clearly see the field defects that cannot be seen in the construction of the building, which is more conducive to the construction site safety the guidance of operations, fast, clear to identify the scene of dangerous information, timely response measures to prevent the occurrence of security incidents. BIM technology to break the traditional construction site two-dimensional drawings of the situation, switch to three-dimensional dynamic simulation, field operators can work through the three-dimensional model of technical instructions, safety issues and security warning and other aspects, fast and accurate grasp of real-time information the BIM technology, which is called Building Information Modeling. Based on the design of buildings, the data information is content, self-integration and screening. Through the form simulation and information coordination, the 3D spatial stereoscopic model is built and the project Management platform. Here, I will be from the following directions on the BIM technology in the field of construction safety instructions on the role of the show.

1 BIM technology features

1.1 Visibility

Visibility is the guarantee of safe construction. BIM technology is the use of three-dimensional simulation technology, the traditional architectural design, are using two-dimensional drawings, and sometimes the design of the drawings on the structure, and cannot reflect the site construction, designers may not be all in place. BIM technology can be in the building before the construction of a three-dimensional design of the building, in all aspects of the building data analysis, increase the visibility of data information, field operations staff can refer to the designer drawings and the actual situation of the real-time analysis of the operation, so not only follow the designer design concept, but also to prevent the occurrence of site safety incidents, early detection of risk, risk prevention to solve the problem of on-site accidents.

1.2 Dynamic simulation

BIM technology based on the relevant data source to simulate the object, the data integration, as a mathematical model, by changing any category parameters and related data with the change. The establishment of correlation with each other, so the site operations. Every day, the instructor can upload the situation to the server terminal at any time, managers and operators can see the situation, information flow, dynamic construction situation is conducive to the management of the risk assessment, at the same time, and operators can see the job information in time to avoid the occurrence of on-site accidents.

1.3 Information coordination

As the saying goes, Rome is not built in one day. Any building construction is not completed in a day or two. Each building needs to work in all aspects of the team work together, then the information communication is particularly important, if the wrong information is passed, not only will cause quality loss, but also cause delays in the construction progress. However, BIM technology can be a good solution to the problem of information flow, because the BIM technology is the construction of the sharing of the server. Each participant can see the progress of the construction, which is more conducive to the exchange of information between the team, management and management personnel in the work instructions easier to handover. In this way, not only to eliminate the information is not smooth, more convenient for everyone to work. Managers can better focus on the scene and real-time observation.

1.4 Budget management

BIM technology on-site operations can be real-time understanding of the completion of the situation. BIM technology through the construction of the construction of the various stages of classification management, and the construction budget of the funds to establish a correlation between the managers in a certain stage of construction is completed, BIM model will be linked with the corresponding funds, managers can see whether the budget is exceeded, as soon as possible to take measures to adjust the funding situation. If much lower than the budget funds, you can check the construction site on-site to prevent the occurrence of follow-up security incidents. In fact, this is also one aspect of the safety assessment.

1.5 Morphological simulation

BIM technology on the shape of the building simulation is conducive to the rationalization of the construction sequence. To know that the construction sequence is very important, because in the construction process, if you do not consider the rationality, not only the progress of the construction will be delayed, but also affect the quality of construction. On the other hand, the designer's design concept cannot be better for the play will be greatly reduced. And BIM technology will minimize such unreasonable occurrence, once the manager of the entire building data input is completed, BIM technology will integrate the data source, the formation of morphological simulation program, the program on the construction process of the order of more rationalization. Taking into account a variety of factors, operators can follow this program operations, managers can more clearly grasp the scene situation.

2 BIM technology in the construction site safety guidance role

2.1 Multi-dimensional spatial planning of construction site

Recently, urban construction intensive, the new construction area has become extremely narrow, not only for the designer is a challenge, on the field operations staff is also a problem. How to effectively use this situation is placed in front of urban builders a problem. If you can make full use of this situation, not only to reduce capital investment, but also make the city more beautiful and a variety of floor types are different, different regional conditions, the shape of a wide variety of shapes, designers in the design of architectural drawings. The traditional CAD drawings can only reflect the vertical plane planning and space three-dimensional interference factors are difficult to all consider, which only the operating staff can see this situation, but if the operation encountered a design problem, then the loss is not only Is to change the drawings so simple, while increasing labor and material costs and operating time. BIM technology can be based on the data upload information integration, the construction area planning, due to relatively large amount of data, BIM on the digital processing can automatically filter the construction is not conducive to the design and construction intent, optimize the design, the maximum treatment of various types information source and optimization of construction planning.

2.2 Visibility makes security guidance transparent

BIM technology visibility characteristics, the biggest advantage is the increase in information flow, superior to the lower level, superior and superior, subordinate and subordinate communication, no meeting room meeting, as long as the server to open the construction status update table, everyone Can see the construction of the building, making the entire project transparent. The management can also control the budget in real time and the scene to make the right judgments for safety management personnel on-site security risks found in time for timely prevention, timely solution, field operations personnel the rapid implementation of the higher order, the quality of a serious grasp of the progress of control, etc., BIM technology can be resolved. Not only is the quality of the operation of the quality of their own security also an indispensable control technology.

2.3 Prevention and isolation of site hazardous areas

BIM technology through the integration of data source three-dimensional technology simulation can directly reflect the construction of the internal environment, managers in the planning period to predict the risk, and do risk education to ensure that the site operators to grasp the risk, while the risk area to have fence and warning signs, and regular quantitative patrolling, to ensure that the warning area of the warning area in a prominent position, and timely deal with the risk to ensure that the construction of personal safety.

2.4 Virtual demonstration and simulation site construction

BIM technology can truly reflect the building information when in combined with VR technology for virtual build site environment. The management can be virtual simulation in the simulation environment, the risk of

personal perception, which is conducive to forecasting risks, reduce production costs and improve on-site construction quality, can advance to see the construction situation, the construction progress in advance to optimize the treatment to maximize the reduction of losses, but also on the site of the personal safety of a guarantee.

2.5 Cloud security check

At present, BIM 360 Glue has been developed and commissioned, we can upload the building space model to the server terminal, managers do not need to take a variety of programs to the scene, just a mobile device, the scene to view the server, the relevant personnel responsible for real-time updates maintenance, the scene of the risk of taking pictures of the upload, each region of the operating staff can also see the risk situation, the occurrence of location, and have to guide preventive measures and operational considerations. Similarly, the site operators can also upload the site through the equipment terminal problems in the cloud to share resources, all the problems will be summarized in the management, management of all the information to aggregate, in order to a solution for the same. The information is also shared in the cloud. Such information flow to a large extent to avoid the scene and the office run back and forth or together to meet, not only save time, but also faster to solve the problem.

2.6 Risk positioning and prevention

Risk is always present, everyone cannot be taken lightly, especially the management, who is not only the construction quality, as well as the safety of the operating personnel. BIM technology through the precise positioning of the risk area, especially the top of the construction risks, including falling, blasting, leakage, etc., in addition to ensuring the timely upload of risk information. This is not enough, you can set the positioning system in the helmet for real-time control of the location of dangerous personnel on-site. When someone close to the danger zone, through the cloud server warning as well as the danger of helmets to inform the two sides to remind people to prevent injury, but also conducive to the safety management know the work.

3 Conclusion

This paper explains the content and function of BIM technology. Through the six-point effect of BIM technology on the scene, it is not difficult to see that the application of this technology is not only the quality and beauty of the building, but also the convenient for the management. Not only can quickly and accurately solve the field problems, but also to protect the safety of the operating personnel. BIM technology can see hidden in the calm of the storm, predict the unknown problem, it can be said that this is a benefit of the cause of human technology, worthy of promotion and development.

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