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THE APPLICATION OF BIM TECHNOLOGY IN CHINA

(Presented by the People's Republic of China)

INFORMATION PAPER

SUMMARY

With the continuous advancement of Building Information Modeling (BIM) technology, its widespread application in airport construction China has significantly improved the industry's level of digitization. This paper introduces the application and practice of BIM technology in the field of airport construction in China.

THE APPLICATION OF BIM TECHNOLOGY IN CHINA

1. INTRODUCTION

Introduction to BIM Technology

1.1 Building Information Modeling (BIM) refers to a process and system that utilizes 3D model as a basic digital representation and incorporates sufficient building information to facilitate the construction and then the operational life. In recent years, extensive BIM applications have shown that BIM has a significant effect on improving engineering quality and management level.

Application of BIM in China's Airport Construction

1.2 With the gradual advancement of global technological capabilities, various new technologies and management models are constantly emerging, among which, BIM technology is a typical representative. In recent years, BIM technology has been applied in large-scale airport construction projects such as Beijing Daxing International Airport, Ezhou Huahu Airport and Chengdu Tianfu International Airport, which plays an important role in assisting airport design, improving construction quality, reducing project costs, saving construction time, etc.

2. DISCUSSION

BIM-based Airport Planning and Design

2.1 In the airport planning phase, BIM technology is applied to a range of aspects, mainly including the selection of short-term and long-term master plan options, airport operations modeling and simulation, airspace planning and flight procedure simulation, operational efficiency and capacity assessment, visualized analysis on obstacle clearance as well as analyses on noise impact, ILS critical and sensitive areas, navigation aids locations, and approach lighting system obstructions, etc. Through specialized simulation analysis, it assists in the decision-making for optimal solutions.

2.2 In the airport design phase, BIM technology application is focused on specialized analyses on structure type selection, major building performance, pedestrian flow, underground space, main pipeline synthesis through modeling, etc. In addition, BIM technology also assists in the detailing of complex structures, synthesis of pipelines constructed by all parties, clash detection in key areas (such as areas of baggage handling system), clear height analysis in major areas and information gathering on materials and equipment, strengthening multi-disciplinary integration and addressing issues such as errors, omissions, clashes and deficiencies in advance.

BIM-based Comprehensive Progress Management

2.3 Project progress management involves time management, cost management, quality management, resource allocation management, and the establishment and tracking of a project schedule. By integrating BIM technology, the construction process is broken down and labor, material, and equipment data can be configured, providing more accurate resource demand information for different phases and construction processes. Combined with progress simulation and comparison, BIM allows for coordination of different works, optimization of construction processes, reduction of errors, omissions, clashes and deficiencies, and resource balance analysis to achieve optimal implementation of the project schedule. Throughout the implementation process, real-time changes of information in each phase together with on-site monitoring information of labor, material, and equipment are obtained to provide real-time feedback on resource allocation. In addition, quality assessment results and work safety inspection outcomes can also be linked to the BIM model, allowing for closed loop tracking of quality and safety issues and feedback of information to each scheduled progress. As a result, it enables both static and detailed dynamic controls of the project.

BIM-based Quality Control

2.4 The detailed BIM model can guide the construction process on site. Construction workers can use tablets to view the model and its three-dimensional representation, enabling a clear understanding of complex processes and technical challenges such as rebar connections and pipeline layout.

2.5 Meanwhile, the construction process and inspection data on site can be added to the attribute information of the BIM model. Management personnel can view the construction process of a component from these data and pictures and trace the quality inspection records of each part.

BIM-based Cost Management

2.6 In the bidding and procurement phase, BIM models are used to develop Bill of Quantity (BOQ), and project management platforms are leveraged to automatically create BOQ. In the project implementation phase, with payment as the starting point, BIM models are linked to quality inspection and evaluation systems, which automatically capture data and evidence links related to the verification of the project quality and generate measurement and payment certificates. This approach promotes strict compliance with preset models and procedures for responsibility implementation. All parties involved in the project use the model to verify construction quantities, ensuring clarity and transparency in the engineering quantity, thereby enhancing project cost control efficiency.

BIM-based Intelligent Operation and Maintenance

2.7 In the operation and maintenance phase, the BIM model acts as a carrier of integrated information. Through unified data interfaces and underlying applications, information from various sources such as the airport, air traffic control units, and airlines can be integrated and displayed on the BIM model. Through visualized integration of data from various isolated systems and the virtual representation of reality, “an integrated map of airport operations dynamics” has been created.

2.8 An airport operations manager can get access to the dynamic information of flights in the airspace flights from ATC units while be able to observe ground vehicles, personnel, equipment and video surveillance. In the event of flight delays or supporting service delays, the manager will be able to respond promptly based on an overall understanding of the situation.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to note the information contained in this Paper.

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