The Problem and Strategy Analysis of Digital Delivery of Urban Rail Transit Project

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ABSTRACT. *With the rapid development of urban rail transit in China in recent years, more severe challenges have been posed to its design, construction and operation stages. Therefore, more scientific and modern design, construction and operation modes are urgently needed for urban rail transit projects in China. At present, the rail transit industry is actively promoting the digital construction system, committed to provide help to solve the above problems, and the delivery of digital design results is the core of the digital construction system. Of current urban rail transit construction in China is relatively mature in digital deliver relevant information to investigate, analysis the advantages and disadvantages of different delivery methods and the existing problems and causes during delivery, with digital delivery platform was put forward to solve the problem of the current urban rail delivery solution measures and means, and on this basis to the platform to continue to develop in the direction of the future are discussed in this paper, to gradually realize intelligent urban rail project information, provide theoretical support.*

KEYWORDS: Urban rail transit, Digital, Delivery

1. Introduction

In recent years, the construction of urban rail transit (hereinafter referred to as urban rail transit) projects in China has presented a trend of sustainable development. The number and types of projects have increased dramatically, posing more and more serious challenges to the design, construction and operation of the projects. Traditional in the design, construction and operation of urban rail transit project in different stages of the connection is not tight, in the full life cycle of the project is lack of the flow of information and interaction, which affect the construction quality and operation of urban rail project comprehensive benefits, for domestic urban rail transit projects needs to be more scientific and modern way of design, construction and operation. At present, the rail transit industry is actively promoting the digital construction system, committed to providing help to solve the above problems. The

digital construction system of urban rail project is complex in content, but its digital design and the delivery of design results are the core of the digital construction system.

2. Advantages Disadvantages and Existing Problens of Digital Delivery Methods

2.1 Delivery Standards in Each Region Are Not Common

The scope of application of the standard not only limits the region, but also limits the corresponding modeling software. Although this is conducive to the formulation of local standards and the review of delivery content, it has affected the sharing of digital delivery information between regions, and it is precisely this information sharing obstacle that makes the overall digital delivery level of domestic urban rail project industry progress slowly.

2.2 The Model is Not Generic

Although the information attached to the 3D BIM model deliverables is rich, each place restricts a certain software for the convenience of review and retention, and even if the software in each place is the same, its delivery standards vary from place to place, which makes the delivered models unable to form effective sharing. And the model is not universal among different software, which makes the respective advantages of different software can not be fully reflected.

2.3 The Coordination Ability of Digital Delivery among Different Majors is Poor

Urban rail project involves a wide range of disciplines, which often require coordination between disciplines in the design and delivery. At present, the coordination among disciplines is basically based on the delivery of time and stage nodes, which not only causes a lot of unnecessary repetitive work, but also tends to cause omissions in the adjustment of delivery documents. Therefore, it is one of the important ways to improve the efficiency to realize the effective cooperative operation among the specialties involved in urban rail construction.

2.4 Inconsistent Phases Covered by Delivery

Among the digitalized delivery of urban rail projects implemented in China, the coverage period of 2d paperless delivery is relatively comprehensive, but the delivery purpose is mainly for the review and retention of drawings. BIM 3d modeling delivery, on the other hand, is mainly aimed at the construction drawing stage, that is, the delivery from the designer to the construction party. Although the present this kind of delivery mode, can guarantee the design to construction link

relatively smooth, but because of the limitations of this model, cause at the early stage of the design scheme is derived, the operational stage actual situation, and even the construction phase construction completion has not been important information such as records, digital, in turn, affects the city rail delivery in every stage of the coverage, the model information can only be used sectioned.

2.5 The Delivery Purpose is Uncertain

Due to the limitation of many factors between regions, cities that have achieved digital design delivery have great differences in the content and degree of delivery required. Digital design, the purpose of delivery not clear and detailed, or a single purpose, and how to make the content of the application again after delivery differences is larger, and even some digital delivery is delivery in order to delivery, and seriously do not accord with the development of scientific, these problems are the cities in the face of how to design digital delivery of a disease.

3. Development and prospect of digital delivery

3.1 Urban Rail Project Information System

Today, as the world enters the information age, information technology and its application have become the lever for the country to realize its development strategy. The value of digital delivery results is reflected in the delivery information. Informatization can promote the industry to complete the transition from extensive management to fine management, and realize the transformation from individual fighting to industrial collaboration. [1]

Research on the collected urban rail project information after extraction and feedback of the research results to the future design can effectively improve the design cycle and avoid deficiencies in the design. Therefore, urban rail project informatization will be an important development direction in the future, and the digital delivery system of urban rail project as the core, gradually form the information system.

3.2 Coordination with Passenger Intormation

The user's feeling, behavior path and so on are one of the research emphases of the current construction industry. Its information value is multifaceted, which can not only be applied to scientific research, but also provide feedback to the design and provide more real data for some simulation. [2] For urban rail project, passengers are one of the important users, and they have a high application value for the station's spatial layout, comfort, convenience and other feelings, as well as the route selection, passenger flow organization and other relevant information. [3]

Digital urban rail project delivery platform, therefore, should through the

passengers in the mobile terminal APP or operators and information sharing, to achieve the cooperation between information platform and passenger behavior, this in order to realize urban rail project information collection and extraction of universal coverage provided help, also for digital delivery platform and large data, the Internet of things, such as the Internet provides a collaborative information network.

3.3 Coupling with Ai Technology

Artificial Intelligence (AI) technology has penetrated into various industries. The advantage of AI technology lies in integrating complex information resources according to the proposed rules, providing reasonable optimization schemes, simplifying complex problems, and even automatically formulating rules and generating schemes in the future according to the purpose. Therefore, it can be predicted that the coupling of urban rail engineering and AI technology will be an important research direction of digital construction in the future. [4]

3.4 Research Direction of Urban Rail Project Information System and Other Systems Expansion

The urban rail project not only carries the information of the building entity, but also carries the potential information such as passenger flow information and regional traffic intervention, which should be combined with other relevant analysis systems to make full use of its value. Therefore, the information system of urban rail project should not be an isolated island, but its information should be fully Shared, aiming at reasonably assisting the construction of a smart city and improving the overall urban quality.

As the main artery of urban traffic, urban rail project has a far-reaching influence on regional economy and urban operation. Therefore, the mutual combination of urban planning information and urban planning information can be more conducive to the scientific development of cities. The advantages brought by combining the information system of urban rail project with other systems, the quality of urban rail project itself is also improved in the process, so as to achieve a win-win goal.

4. Conclusion

Realizing digital construction of domestic urban rail tracks is an important development strategy of this industry, the core and foundation of which is to realize scientific, information-based and standardized delivery of digital design results. Based on the investigation of digital delivery in mature urban rail projects in China, it is found that the current digital delivery is developing slowly with little effect, but the problem lies not in the digital way itself, but in the unscientific delivery system.

The core of solving the current digital delivery problem of urban rail project is to build a digital delivery platform that can cooperate with operation, share information and cover the whole life cycle of the project. Besides, the platform is not only limited to the digital delivery of urban rail projects, but also can gradually make urban rail projects informationized and intelligent and expand into the backbone network of smart cities, so as to make contributions to improving the overall quality of cities.

Acknowledgments

References

[1] Zhen Feng, Qin Xiao (2014). Application of Big Data in smart City Research and Planning [J]. International Urban Planning, no.6, pp.44-50.
[2] Ran Bin (2013). Application of mobile Phone Data in Traffic Survey and Traffic Planning [J]. Urban Traffic, no.1, pp.72-81+32.
[3] Wu Zhiqiang, Ye Zhongnan (2016). Research on Urban Spatial Structure based on Thermal Map of Baidu Map -- A Case study of Central City of Shanghai [J]. Urban Planning, no.4, pp.33-40.
[4] He Yuyan (2017). Application of Artificial Intelligence in Intelligent Buildings [J]. Communications World, no.6.pp.256-257.