

Solution to smart construction site mobility based on heterogeneous data integration

Li Donghui

Yichang Construction Market and Construction Engineering quality and Safety Supervision Station, Yichang Housing and Urban-Rural Development Bureau, Yichang Hubei, 443000, China

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Abstract: With the development of the times, China's economy is developing fast, meanwhile, the current communication technology is developing rapidly as well. Our country has stepped into the era of information, and under the background of continuous development, our country still pays much attention to the development of building industry. Nowadays, the building industry in our country has presented a trend of rapid development, while various tool and management softwares are applied in specific construction process. With the continuous improvement of science and technology, engineering construction has become simpler, therefore, from perspective of current development situation, integrating various heterogeneous data and making full use of information technology have become the emphases in building industry. This paper takes smart construction site of Beijing Daxing International Airport as an example to introduce the solution to smart construction site mobility.

1. Introduction

In the traditional development process, the traditionally-heavyweight PC terminal is the important part in people's life, but with the continuous development of information technology, it has gradually transformed into mobile application mode, which has brought great convenience and advantages to people's work and life. Currently, various industries have applied the PC terminal mobile application mode widely, especially the building industry. In the current development process, the building industry lays emphasis on collaboration of construction team members, problem tracking and solving abilities of construction team, and pays more attention to construction site security and greening, simply speaking, higher and higher requirement on engineering construction is needed in the building industry.

2. Industry background

2.1 Industry analysis

As the time goes on, people have ushered in the information age. In view of the current development situation of building industry in our country, there are nearly 500,000 construction projects which are distributed dispersedly, and meanwhile, over 60,000,000 personnel are engaging in the building industry. It can be easily seen than there are numerous construction projects in our country with large quantity of participants, and this is one of the reason why the building industry in our country can realize rapid development in recent years, however, owing to huge investment and large quantity of participants, the government and related departments face some serious problems in the management process. Wherein, the related departments and the government are disorganized in the management process, and as a result, the traditional, simple and crude management mode no longer meets with the development requirement of the current era. Therefore, refined management mode and informatization management means must be adopted in the management process in order to realize better development of the current enterprises and the building industry.

In the current development process, many industries in our country have begun to use informatization management mode, but owing to the particularity of the building industry, our

country is low in the informatization management level, in addition, the government and related departments don't recognize the importance of informatization management thus to cause certain lagging in the management process. Technology investment increase in the building industry and technology introduction of enterprises have accelerated penetration of information technology in the building industry of our country, therefore, making full use of information management technology can promote the development of the building industry in our country better.

2.2 Industry requirement

Though the building industry in our country has presented a trend of rapid development and faces many opportunities in the development process, it also faces some challenges. In the current development process of building industry, the problems appear frequently, such as construction accident, noise pollution and nonstandard operation, which have caused hinder in the development of the building industry. Therefore, for the purpose of realizing better development of the building industry, it is needed to solve the various problems existed in the construction process firstly. Mobile informationization based on heterogeneous data integration can effectively help the government to conduct efficient management on engineering construction and constantly enhance the management level of construction enterprises thus to realize rapid development of the building industry.

3. Project overview

This paper conducts systematic research on the construction problems of Beijing Daxing International Airport and finds that Beijing Daxing International Airport pays much attention to regulatory informatization in the management process and clearly requires the realization of the following functions of informatization platform in the construction process. Firstly, it requires to realize monitoring on integrated videos, conduct unified monitoring on construction personnel and release unified entrance guard card and food card to them. The construction personnel should realize data sharing and connection in specific work process thus to guarantee themselves to perform their responsibilities better, while the construction enterprise will provide unified mobile phone APP applications for each personnel. Secondly, the project management personnel should conduct real-name management on each personnel, know the labor force situation regularly thus to provide corresponding basis for management decisions timely. Besides, they should conduct attendance management on construction personnel each day and provide corresponding informatization management systems for daily diet and accommodation of all personnel thus to guarantee legal interest of each personnel.

In the informatization management process, the management personnel should take project schedule as the main management basis, what's more, the various departments should cooperate with each other. When they face some problems, they should make timely communication and find solutions, and they should make timely feedback in face of problems in specific construction process thus to realize effective management of the production and design processes. Such kind of management mode can improve engineering construction efficiency constantly and enhance the refined management level to a new height.

4. Solution

In the specific construction process of the smart construction site based on heterogeneous data integration, it is needed to firstly establish unified user platform which is a comprehensive system for integrating various businesses and can largely reduce information statistics complication for users and provide two kinds of services for users. In view of construction personnel, it is needed to provide corresponding monitoring on fire control, conduct real-name management and set multiple management systems in offices to realize systematic management on daily work, which can effectively enhance users' experience.

In addition, it is needed to provide various mobile applications besides establishing unified user

platform. For example, in the construction process of smart construction site, Beijing Daxing International Airport lays emphasis on mobile information service, provides more extensive service scope for applications of authorized mobile phones and makes clear the function authority and scope of each personnel thus to establish a basic management framework. In the management process, the construction personnel are divided into different teams, wherein, each team will select corresponding manager while the manager can refer to personal information and attendance situation of each person through mobile end, which can realize timely and efficient management on construction personnel.

In the management process of office work collaboration, the periodic schedule is the main management content, wherein, various departments must make clear their responsibilities and tasks and dispatch models timely thus to complete tasks efficiently. The managers can distribute temporary tasks timely and should effectively guarantee task completion in the first time. Once the tasks become clearer, enough time will be left for responsible persons. After the temporary tasks are distributed completely, related responsible personnel should make timely feedback about their tasks. Besides, various problems will certainly appear, therefore, it is needed to realize early-warning intellectualization, namely, set early-warning information in each key task node, and accordingly, early-warning information will be sent to the managers in the first time when some problems appear, therefore, the managers will lay emphasis on the tasks and solve the problems in the first time.

Flattening of information transmission is also an important part. It is needed to conduct deep analysis on various project management systems before project construction, realize information summary and feedback and conduct concentrative processing on the information from basic levels. And then information positioning and pushing can be fully realized according to the responsibility and authority of each manager. Flattening of information transmission can effectively strengthen organizational strain capability on environment, and can avoid invalid information in face of some problems in specific process.

5. Construction significance

5.1 Realize large collaboration

It can be seen based on analysis on smart construction site of Beijing Daxing International Airport that engineering construction is a comprehensive process integrating manpower, material resources, financial resources and various technologies, which centers on a proposed project to carry out specific construction activities. In the construction process, various units and construction personnel must have good collaborative ability thus to guarantee smooth engineering construction. But from perspective of the current development process, various departments need to bear high collaboration cost in order to realize good collaborative effect, however, the collaborative efficiency is declining based on high cost and causes construction orientation deviation of many engineering construction companies. Therefore, it is needed to strengthen collaborative work efficiency constantly and guarantee comprehensive collaboration of fragmented application foundation thus to improve collaborative efficiency, which is a good way for enterprises and construction side without increasing the collaborative cost.

5.2 Strengthen security management

Building industry is a high-risk industry, and correspondingly, various unforeseen circumstances will appear in the construction process, therefore, security management has become particularly important, which requires the building industry to strengthen video monitoring and environment monitoring in specific construction process thus to guarantee personal security of each personnel, besides, automatic alarm system must be installed aiming at dangerous machinery such as tower crane and crane thus to avoid some accidents. In order to realize rapid and efficient development of the building industry, it is needed to guarantee construction civilization and the life and property security of construction personnel firstly, and only in this way can the social order be further stabilized and can the building industry realize efficient development.

5.3 Provide support to green construction

In the construction process, the problems of energy saving, water saving and environmental protection should be emphasized besides guaranteeing construction quality. Moreover, noises and dusts must be controlled timely, if the noises and dusts are beyond standard scope, timely measures must be taken. In addition, the supervision department must conduct strict supervision on the construction site and make timely correction on existing problems thus to guarantee penetration of green building concept.

6. Conclusion

In summary, the smart construction site project has gradually transformed into a mature project, meanwhile, information technology of rapid development has provide a perfect monitoring and management system for the building industry. Wherein, this system mainly centers on management personnel and construction personnel, involves various construction links, provides effective reference and suggestions for mobile information monitoring solution to construction site.

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