

Study on Safety Management of Deep Foundation Pit Construction Site Based on Building Information Modeling

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Abstract : The 21st century has been called the century of human exploitation of underground space. Due to the characteristics of large quantity, tight schedule, low safety reserve and high uncertainty of deep foundation pit engineering, accidents frequently occur in deep foundation pit engineering, causing huge economic losses and casualties. With the successful application of information technology in the construction industry, building information modeling has become a research hotspot in the field of architectural engineering. Therefore, the application of building information modeling (BIM) and other information communication technologies (ICTs) in construction safety management is of great significance to improve the level of safety management. This research summed up the mechanism of the deep foundation pit engineering accident through the fault tree analysis to find the control factors of deep foundation pit engineering safety management, the deficiency existing in the traditional deep foundation pit construction site safety management. According to the accident cause mechanism and the specific process of deep foundation pit construction, the hazard information of deep foundation pit engineering construction site was identified, and the hazard list was obtained, including early warning information. After that, the system framework was constructed by analyzing the early warning information demand and early warning function demand of the safety management system of deep foundation pit. Finally, the safety management system of deep foundation pit construction site based on BIM through combining the database and Web-BIM technology was developed, so as to realize the three functions of real-time positioning of construction site personnel, automatic warning of entering a dangerous area, real-time monitoring of deep foundation pit structure deformation and automatic warning. This study can initially improve the current situation of safety management in the construction site of deep foundation pit. Additionally, the active control before the occurrence of deep foundation pit accidents and the whole process dynamic control in the construction process can be realized so as to prevent and control the occurrence of safety accidents in the construction of deep foundation pit engineering.

Keywords : Web-BIM, safety management, deep foundation pit, construction

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