

## **Safety Analysis Intensified by Construction Information Modeling in Facility Plan of Underground Spaces**

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### **Abstract**

Construction Information Modeling, abbreviated to CIM hereafter, which has been extended from BIM, i.e., Building Information Modeling in the field of architecture, intends the efficiency of infrastructure arrangement by enabling information sharing and utilizing, visualization, and collaboration with analytical tools of three-dimensional space modeling for all the infrastructure arrangement process of planning, designing, construction and maintenance. Subway station is usually recognized to consist of architectural, electric and civil engineering elements as an example of infrastructure. These sectors have usually attained their own tasks independently. The integration of all the electronic data will improve the space design, utility management, risk management and efficiency of works for all the facilities by means of CIM. The Ministry of Land, Infrastructure, Transportation and Tourism, Japan, started a project to prevail the CIM in 2012. The project contains the collaboration with JSCE, Japan Society for Civil Engineers. Main activities have been done in the section of ICT construction group of the committee of information in civil engineering ICT construction. Based on the background as stated above, this research discusses the possibility of CIM to develop the city underground space including a subway station and car parking lots. It particularly aims to reduce inundation risk, energy exhaustion, and barriers to handicapped persons, which should be treated widely as the high-quality public service. It firstly built a three-dimensional space model by means of the data created in the process of designing and furnished by field survey. It secondly analyzed and solved the risk of inundation by the so-called “guerilla rainfall” over the subway station and underground shopping mall. The results of simulation analysis did not only show the hydraulic distribution of inundation but also provide the adequate countermeasures in response to the sequence of events such as rainfall and actions of the concerned sectors. It concluded that the different sectors, the subway facility manager, shopping mall manager, electric maintenance worker, fire fighter, and so forth, could be associated with the CIM system. CIM may be a good measure for regional integration.