



Rapport de veille n° 36

BIM

30/06/2022

Objectif : *L'utilisation du BIM en phase de conception et de ses potentiels applications pour la prévention des risques*

La validation des informations fournies (exactitude, fiabilité, pertinence par rapport aux principes de prévention, etc.) est du ressort des auteurs des articles signalés dans la veille. Les informations ne sont pas le reflet de la position de l'INRS.

Les liens mentionnés dans le bulletin donnent accès aux documents sous réserve d'un abonnement à la ressource.

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1.1 Articles scientifiques

BIM-based construction safety risk library

WH Collinge, K Farghaly, MH Mosleh, P Manu... - Automation in Construction, Volume 141, September 2022

DOI : <https://doi.org/10.1016/j.autcon.2022.104391>

This paper presents a digital tool and Safety Risk library to assist designers in their health and safety work in BIM digital environments. Addressing an industry need for improved knowledge sharing and collaboration, the BIM Safety Risk library tool aligns with a Prevention through Design (PtD) approach that links safety risks to treatments via different risk scenarios. Motivated by continuing sub-optimal health and safety management processes, the research employs a conceptual framework rooted in construction guidance: structuring data via a 7-stage ontology to improve designer knowledge of issues and give access to an expanding safety knowledge base (the BIM Safety Risk Library). The tool facilitates tacit and explicit knowledge sharing in visual environments, enabling the construction industry to benefit from their health and safety data while providing an interactive learning tool for designers. The structuring of data also opens up possibilities for other digital advances (e.g. via automatic rule checking).

Construction and Evaluation of Construction Safety Management System Based on BIM and Internet of Things

H Yu, F Liu, Y Wang - Security and Communication Networks, 2022

DOI : <https://doi.org/10.1155/2022/1541241>

With the continuous development and maturity of technology, the Internet of Things has gradually been applied to various fields of work and life, for example, the use of the Internet of Things and road traffic, the use of the Internet of Things smart city for vehicle identification and GPS positioning, the use of the Internet of Things smart medical smart heart pulse monitoring device, and so on. And, the construction industry bears important responsibilities for the development of national infrastructure and people's livelihood. This article aims to study the application of BIM and Internet of Things technology in the safety management of construction sites, to drive technological development with industry needs, help expand the application fields of the Internet of Things, and promote the improvement of the national construction safety management system. This article uses BIM and Internet of Things technology to build a construction safety management system, focusing on the protection of people, through technical means, such as personnel activity control, hazard warning, major hazard monitoring, and multiple institutional measures, such as education, training, supervision, and protection, that collaborate to complete the protection and risk avoidance of operators in the process of building construction. The evaluation index of the safety management system is proposed through the analytic hierarchy process, and the dimension of the safety management system to prevent accidents is evaluated by the analytic hierarchy process. Taking the actual project as an example, the application effect of the remote monitoring system is qualitatively analyzed. On the basis of the analysis, from the three levels of policy, enterprise, and practitioners, several suggested measures that will help new technology to be applied to construction safety management are put forward. In the experiment part, the construction of the safety management system is first explained, then the appropriate system evaluation index is selected, and then the comprehensive ranking is conducted according to the relative importance weight of the highest-level elements in the same level, and the MATLAB software is used to test the consistency. The experimental results show that the construction safety management system constructed in this paper has been well perfected. The calculated weights of people and dangerous areas are as high as 0.578, so that people and dangerous areas can be controlled effectively. Fall accidents from high places can be prevented, full-time monitoring of foundation pit projects can also avoid fall and collapse accidents from

high places, improve the comprehensiveness and advancement of construction safety management, and improve the level of construction safety management.

Using BIM in the safety risk management of modular construction

M Chatzimichailidou, Y Ma - Safety Science, Volume 154, October 2022

DOI : <https://doi.org/10.1016/j.ssci.2022.105852>

Governments internationally encourage and support the development of modular buildings as they can improve efficiency in the construction industry. Meanwhile, judging from the numerous reports published by public agencies responsible for the regulation and enforcement of workplace safety (e.g., HSE UK), occupational health and safety is an important aspect that the construction industry has been concerned with as there is still much room for improvement. Therefore, practitioners and scholars have begun to study the safety risks of modular construction. In a similar manner, this paper summarises the existing literature on the application of Building Information Modelling (BIM) technology in the safety management of the construction industry in general and the main safety hazards of modular construction. The authors then analyse the application of BIM technology in the safety risk management of modular construction as a joint topic. This is the main contribution of this paper as there is very little research being done that links all three subjects together. The findings show that BIM technology has a great application potential in modular construction, and specifically in the training of staff, safety inspection, and crane management. By adopting BIM-based solutions it is likely to improve worker safety awareness, detect hazardous factors and scenarios and optimise site layout.