



Rapport de veille n° 57

BIM

31/03/2024

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. Références anglophones

1.1 Articles scientifiques

[Integrating BIM and computer vision for preventing Hazards at construction sites \[PDF\]](#)

T Si - HO CHI MINH CITY OPEN UNIVERSITY JOURNAL Engineering and Technology, 14(1), 2024, 10 p.

DOI : 0.46223/HCMCOUJS.tech.en.14.1.2966.2024

Construction safety monitoring is vital in enhancing site safety, such as tracking entering hazardous areas and the correlation between workers and other hazard entities. Therein, computer vision-based image/video processing, one of the emerging technologies, has been actively used to automatically identify and recognize unsafe conditions. However, the construction site has various potential hazard situations during the project. Due to the site's complexity, many visual devices simultaneously participate in monitoring. It challenges developing and operating corresponding detection algorithms at specific workplaces and times. Besides, safety information detected by computer vision must be organized before being delivered to stakeholders. Hence, this study proposes an approach for construction safety monitoring using vision intelligence technology and BIM-cloud, called BMT. The BMT comprises two modules: (1) the virtual model based on the 4D BIM-cloud model, which provides the spatial-temporal information to decide computer vision algorithm adoptions; (2) the construction physical model built the vision intelligence technologies, which is supported by (1) and deliver safety status and update into the BIM-cloud model to visualize and deliver the risk level to related employees. The efficiency of the BMT approach is validated by testing with the preliminary implementation of a prototype.

[Integration of BIM data and real-time game engine applications: Case studies in construction safety management \[PDF\]](#)

AAU Zaman, A Abdelaty, MHR Sobuz - Journal of Information Technology in Construction, 2024, vol. 29, pp. 117-140

Doi : <https://doi.org/10.36680/j.itcon.2024.007>

Building Information Modeling (BIM) has unique features that improve safety management in construction by visually identifying potential risks. Integrating BIM with a real-time game engine is a cutting-edge idea for more effective safety management. This study aims to conduct two case studies by integrating BIM data with game engines from two aspects: 1) Construction Safety Training and 2) Pre-construction Safety Management. A framework that covers techniques for extraction of safety ideas, managing the game engine, and character modeling tools and resources is used to carry out the case studies. In the first case study, a construction site was created by Revit, and a real-life scaffolding failure accident was simulated by Unity to warn workers to prevent similar future events. The second case study was conducted on the procedure of evacuation modeling in an emergency, integrating a BIM model and Unity following distinct pathways. This evacuation modeling can be used as a training platform for the occupants to acquaint themselves with the inside facility, show directions of the shortest evacuation path from specific points, and provide necessary information on emergency equipment. Finally, the study explains how the integration of the BIM model and game engine applications can be applied for effective, straightforward, and helpful safety management with the most efficient BIM data transition.

Investigating safety development methodologies in the construction industry and identifying gaps in the studies: a review article

M Pouyakian, AA Shafikhani, AA Najafi... - International Journal of Critical Infrastructures, 2024, Vol. 20, n° 2, pp 163-194

DOI : <https://doi.org/10.1504/IJCIS.2024.137403>

Identifying the appropriate safety methodology is essential to improving construction safety performance. This study aims to investigate safety development methodologies in the construction industry and identify gaps in the studies. Articles published from 2000 to 2022 were reviewed. Seventy-seven eligible articles were selected based on comprehensive and exclusive criteria. After obtaining selected literature, gaps in using these methodologies were discussed. Twelve criteria were used to compare safety methodologies. The selected literature focused more on the construction phase and did not provide an effective strategy in the project planning phase. Although the studies had specific benefits, none examined the safety program based on actual project conditions (resource, time, and cost constraints). There is a need for a model that examines safety in terms of actual project conditions (time, cost, and resource constraints). In addition, the model must optimise not only safety but also other vital components of the project (cost, time, and quality) while considering resource constraints (especially equipment constraints). If such a model is designed, the project team will not resist safety changes, which benefits all the construction stakeholders.