



Rapport de veille n° 50

BIM

31/08/2023

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.

Table des matières

1. Références anglophones	3
1.1 Articles scientifiques	3
1.2 Conférence / ouvrage / thèse	3

1. Références anglophones

1.1 Articles scientifiques

[Integrating 4D Simulation and Automation Features of BIM toward Construction Safety Management \[PDF\]](#)

EN Piniano, M Iwanami - International Journal of Structural and Civil Engineering Research Vol. 12, No. 3, August 2023, 8 p.

DOI : 10.18178/ijscer.12.3.68-75

Despite the benefits that the construction industry contributes to the global economy, the impacts that it causes on occupational safety remain a significant concern. Moreover, specific systems are necessary to account for the factors influencing the implementation of construction safety. Proportionately, integrating advanced technologies such as Building Information Modelling/Management (BIM) manifests as one of the strategies for mitigating construction safety programs. Thus, this research aims to expand previous research and fill the gaps in current measures taken for adopting and implementing BIM, focusing on improving construction safety management and implementation. This study presents a framework that incorporates 4D Simulation and automation features of BIM. The framework aims to overcome challenges related to regulating construction schedules, taking into account weather conditions, and adhering to standard safety codes in the construction safety planning process. The ultimate goal is to promote sustainable construction safety management. This research conducts a case study on a large-scale incineration project in Japan, considering the Japanese construction working environment and Japan Industrial Safety and Health Association (JISHA) and JICA Safety Standard Specifications (JSSS).

[Usage of digital technology in improving the mental health of workers on construction sites](#)

AU Nelumdeniya, B Perera, KDM Gimhani - Construction Innovation, 2023

DOI : <https://doi.org/10.1108/CI-08-2022-0214>

The purpose of this study is to investigate the usage of digital technologies (DTs) in improving the mental health of workers on construction sites. A mixed research approach was used in the study, which comprised a questionnaire survey and two phases of semi-structured interviews. Purposive sampling was used to determine the interviewees and respondents of the questionnaire survey. Weighted mean rating (WMR) and manual content analysis were used to rank and evaluate the collected data. The findings of this study revealed bipolar disorder, anxiety disorders, attention-deficit/hyperactivity disorder, obsessive-compulsive disorder, work-related stress and depression as the six most significant mental disorders (MDs) among the construction workforce and 30 causes for them. Moreover, 27 symptoms were related to the six most significant MDs, and sweating was the most significant symptom among them. Despite that, 16 DTs were found to be suitable in mitigating the causes for the most significant MDs.

1.2 Conférence / ouvrage / thèse

[Digital Twin Framework for Worker Safety using RFID Technology](#)

A Paul, S Pulani, JU Maheswari - ISARC. Proceedings of the International Symposium on Automation and Robotics in Construction; Waterloo Vol. 40, : IAARC Publications. (2023): 254-261.

Construction 4.0 and Digital Twin are the emerging concepts of the digital era in the Construction Sector. The crux of these digital technologies lies in capturing the rich “real physical” data to model the “virtual” structure to enable the experiments for specific decision-making. Although protocols for the hazardous operations had

been chalked out meticulously across the globe through several organizations using stern safety regulations and codal provisions, still the goal of zero-accidents at the construction site has not been achieved. One of the several reasons for accidents occurrence can be that safety is not always in the minds of the workers and require a third-party intervention. Hence, the objective of this study is to safeguard the workers working in the construction sites using digital platforms (third-party) where the safety is monitored round the clock. The scope of this study is limited to falling of materials, equipments and workers. To achieve this objective, RFID (Radio Frequency Identification System) is used to capture the site data and is modelled in BIM (Building Information Modeling) using Dynamo. Job safety analysis is performed in the BIM software and this experiment is conducted on some hypothetical construction sites-in progress and the initial results have received positive feedback.

[Evaluation of fire risk assessment in Chennai construction sites using artificial intelligence and BIM: An agenda for the future](#)

SK Kalidass, J Ravi, PK Mohan, G Senthil... - AIP Conference Proceedings 2790, 020018 (2023)

DOI : <https://doi.org/10.1063/5.0152905>

Construction industry experts are constantly implementing technology to improve construction Safety management at site. We can think of Artificial Intelligence (AI) as a tool to solve existing challenges. This research proposes the creation of an AI platform to help with construction safety through pre-construction danger identification, and recommends the OSHA codes. Construction sites in Chennai are notoriously complicated, with operations, procedures, technologies, individuals engaged, location, geography, and constantly changing site dimensions. High number of fatal and non-fatal incidents on construction sites demonstrates the importance of a comprehensive safety and fire risk assessment. A detail literature review has been carried out and questionnaire surveys have been conducted to gain a clear understanding of the current state of occupational safety, health and environmental standards and compliances in the Chennai construction sector. Project safety and risk assessment is carried out by specialists who make decisions based on their own experiences. There is a lack of a systematic strategy as well as techniques to verify the accuracy of these decisions. We can automate the process and create an environment where possible risks are spotted before they occur. Both residential and commercial building sites have occupational safety and environmental difficulties. Workers, management, and staff will get more information and awareness as a result of the study's conclusions being implemented. The ultimate goal should be to achieve healthy and environmentally friendly building sites in the Chennai district.