



Rapport de veille n° 45

BIM

31/03/2023

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.

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1. Références anglophones

1.1 Articles scientifiques

Reducing Falls from Heights through BIM: A Dedicated System for Visualizing Safety Standards

A Tariq, B Ali, F Ullah, FK Alqahtani - Buildings, 2023, 13, 671

DOI : <https://doi.org/10.3390/buildings13030671>

Falls from height (FFH) are common safety hazards on construction sites causing monetary and human loss. Accordingly, ensuring safety at heights is a prerequisite for implementing a strong safety culture in the construction industry. However, despite multiple safety management systems, FFH are still rising, indicating that compliance with safety standards and rules remains low or neglected. Building information modelling (BIM) is used in this study to develop a safety clauses visualization system using Autodesk Revit's application programming interface (API). The prototype digitally stores and views clauses of safety standards, such as the Operational Health and Safety Rules 2022 and Introduction to Health and Safety in Construction by NEBOSH 2008, in the BIM environment. This facilitates the safety manager's ability to ensure that the precautionary measures needed to work at different heights are observed. The developed prototype underwent a focus group evaluation involving nine experts to assess its effectiveness in preventing FFH. It successfully created a comprehensive safety clause library that allows safety managers to provide relevant safety equipment to workers before work execution. It also enhances the awareness of construction workers of all safety requirements vis-à-vis heights. Moreover, it creates a database of safety standards that can be viewed and expanded in future by adding more safety standards to ensure wider applicability.

Survey Evaluation of Building Information Modelling (BIM) for Health and Safety in Building Construction Projects in Malaysia

WS Alaloul, AH Qureshi, YP En, SA Khan, MA Musarat... - Sustainability, 2023, 15(6), 4899

DOI : <https://doi.org/10.3390/su15064899>

Traditional safety planning methods that rely on manual inspections result in labour-intensive, time-consuming, and inadequate information transmission, which has significant negative social and economic effects on our society, as well as financial and schedule losses for construction projects. Building information modelling (BIM) is useful for analysing workplace safety issues, preventing risks and hazards, and improving safety throughout the project's life cycle. This study intends to pinpoint health and safety concerns and to understand the role of BIM adoption in enhancing health and safety in Malaysian building construction projects. Following a survey of 302 Malaysian construction industry professionals, statistical data analysis using the relative importance index, reliability, validity, and correlation measures was performed. The results show that implementing BIM can prevent accidents on construction sites by detecting physical spatial clashes, anticipating project dangers, and providing a wealth of parametric data throughout the entire life cycle of structures. A framework was created to improve the application of BIM to enhance health and safety linked with construction projects. The study found that construction industry stakeholders believe that BIM implementation in construction projects can improve health and safety and reduce accident rates in Malaysia.

Benefits and challenges relating to the implementation of health and safety leading indicators in the construction industry: A systematic review

RN Phinias - Safety Science, Volume 163, July 2023, 106131

DOI : <https://doi.org/10.1016/j.ssci.2023.106131>

Organisations have used both Health and safety (H&S) lagging and leading indicators as part of the measures taken to manage H&S. However, in recent years researchers have advocated strongly for the use of leading

indicators over lagging indicators. While the use of leading indicators to improve H&S performance is well documented. However, there is no systematic literature reviews of the benefits and challenges relating to their implementation in the construction industry. This study aims to provide an overview of leading indicators as well as to identify the benefits and challenges relating to the implementation of leading indicators in the construction industry. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) procedure is used to conduct a systematic literature review. Scopus and Google Scholar produced a total of 335 articles. Based on the inclusion and exclusion criteria, 34 articles were considered relevant for review. Content analysis was applied, and the study identified eight benefits (identification of construction accidents, measurement and monitoring, prevention of construction accidents, early warning system, increase compliance with H&S legislations, anonymity and confidentiality, predictions and control measures) and eight challenges (training and communication, leadership and commitment, time and cost, effectiveness and uncertainty, varying definitions, dominance of quantitative indicators, convenience and worker involvement and participation) relating to the implementation of leading indicators. Study findings are critical for increasing construction practitioners and researchers knowledge and understanding of benefits and challenges relating to the implementation of leading indicators.

1.2 Conférence / ouvrage / thèse

Building Information Modeling for Risk Management: A Literature Review

L Ortiz-Mendez, A de Marco, G Castelblanco - In: Alareeni, B., Hamdan, A., Khamis, R., Khoury, R.E. (eds) Digitalisation: Opportunities and Challenges for Business. ICBT 2022. Lecture Notes in Networks and Systems, vol 620. Springer, Cham, pp. 3-10

DOI : https://doi.org/10.1007/978-3-031-26953-0_1

Building Information Modeling (BIM) has become more relevant to the construction industry in recent years due to almost all of the biggest industries use BIM as a tool to improve the integration process and risk management. Although there is significant literature on risk management and BIM, the relationship between both of them has not been covered in previous research. This study provides a thorough explanation of the relationship between the interaction with risk management and BIM, as well as how it has evolved. Following a screening procedure, 190 peer-reviewed papers were pulled from the Scopus database. Findings showed that the introduction of risk management into BIM is still in an incipient phase within the construction project management body of knowledge. Overall, three developed nations—the USA (with 30 documents), Australia (21) and China (21)—have steered this research agenda, while a developing country—Malaysia (17)—is an outsider gaining relevance as the fourth contributor to this topic. Five clusters were identified by the network representation, these clusters include risk and project management areas that constitute the research paths to be advanced in the next few years.