



Rapport de veille n° 35

BIM

31/05/2022

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.

Table des matières

1. Références anglophones	3
1.1 Articles scientifiques	3
1.2 Conférence / ouvrage / thèse	5

1. Références anglophones

1.1 Articles scientifiques

[BIM approaches for enhanced health and safety status in construction-protocol for a systematic review: Protocol \[PDF\]](#)

A Sidani, JP Martins, A Soeiro - ... Journal of Occupational and Environmental Safety, 2022, 8 p.

DOI : https://doi.org/10.24840/2184-0954_006.001_0001

The construction industry is complex, dynamic, multicultural, and full of diverse activities and dangerous machinery. Many accidents occur because of limiting factors, such as safety and health culture, requirements, poor training of workers, and the restricted technologies implemented to prevent, plan, and monitor risks. Building Information Modelling (BIM) is recognised to enhance project management, planning, and inspection, reduce time and costs, strengthen collaboration, and decrease risks and accidents. A wide array of BIM-based tools and technologies with various functionalities are being investigated to enhance construction workers' health and safety. Among such technologies and methods are tracking devices, Augmented and Virtual Reality (AR/VR), automated rule checking, risk identification and Artificial Intelligence (AI). A systematic review following PRISMA Statement is proposed, aiming to investigate the current BIM-based technologies and evaluate effectiveness and usability within the Architecture, Engineering, Construction and Operations (AECO) industry to enhance occupational health and safety status. Consequently, this PRISMA Protocol (PRISMA-P) represents a complementary document to the systematic review that will be developed. Related articles will be gathered from top electronic databases in construction, safety, and health fields. Moreover, the literature review will focus on the BIM and associated technologies utilised in the AECO sector, exploring the construction fields, targeted groups and the system architectures developed. Likewise, examine the evaluation methods of the implemented tools to assess each technology's effectiveness. Finally, after stating the limitations of each study, the article will propose a safety and health framework involving the most efficient tools involving the whole project lifecycle.

[Safety Built Right in: Exploring the Occupational Health and Safety Potential of BIM-Based Platforms throughout the Building Lifecycle](#)

M Hoeft, C Trask - Sustainability, 2022, vol. 14, issue 10, 1-25

This article investigates the opportunities of using digital building platforms based on Building Information Modelling (BIM) to increase occupational health and safety (OHS) in building design, construction, operation and deconstruction. The data collection followed a mixed-method approach with a systematic mapping review and focus group discussions with industry practitioners from the Swedish construction and real estate industry. Use cases were identified from both venues, as were prevailing barriers, potential facilitators, best practices and future applications. The findings highlight OHS potentials of digital building platforms for Rule-Based Checking and Design Validation, Team Building and Communication, Site Layout and Task Planning, Real-Time Monitoring, Equipment and Temporary Structures, Robotic Task Performance and Learning and Documentation. A set of principles is proposed to promote a higher degree of lifecycle and stakeholder integration: (1) technology, (2) data and information, (3) business and organization, (4) people and communication and (5) industry structure and governance aspects.

[BIM approaches for enhancing safety and health Status in AECO sector: protocol for a systematic review \[PDF\]](#)

A Sidania, JP Martinsb, A Soeiroc – International Journal of Occupational and Environmental Safety, Vol. 6, n°1, 2022, 8 p.

DOI : https://doi.org/10.24840/2184-0954_006.001_0001

The construction industry is complex, dynamic, multicultural, and full of diverse activities and dangerous machinery. Many accidents occur because of limiting factors, such as safety and health culture, requirements, poor training of workers, and the restricted technologies implemented to prevent, plan, and monitor risks. Building Information Modelling (BIM) is recognised to enhance project management, planning, and inspection, reduce time and costs, strengthen collaboration, and decrease risks and accidents. A wide array of BIM-based tools and technologies with various functionalities are being investigated to enhance construction workers' health and safety. Among such technologies and methods are tracking devices, Augmented and Virtual Reality (AR/VR), automated rule checking, risk identification and Artificial Intelligence (AI). A systematic review following PRISMA Statement is proposed, aiming to investigate the current BIM-based technologies and evaluate effectiveness and usability within the Architecture, Engineering, Construction and Operations (AECO) industry to enhance occupational health and safety status. Consequently, this PRISMA Protocol (PRISMA-P) represents a complementary document to the systematic review that will be developed. Related articles will be gathered from top electronic databases in construction, safety, and health fields. Moreover, the literature review will focus on the BIM and associated technologies utilised in the AECO sector, exploring the construction fields, targeted groups and the system architectures developed. Likewise, examine the evaluation methods of the implemented tools to assess each technology's effectiveness. Finally, after stating the limitations of each study, the article will propose a safety and health framework involving the most efficient tools involving the whole project lifecycle.

[Building Information Modeling \(BIM\) for managing job security in low-income housing projects](#)

RM Seixas, LMF Maués, CCN Rosa, FA Oliveira - *Ambiente Construído*, 22 (3), Jul-Sep 2022

DOI : <https://doi.org/10.1590/s1678-86212022000300617>

Civil construction has peculiar characteristics such as low communication between the designers and the site managers, in addition to a high turnover of construction workers, which creates difficulties to implement an effective safety culture. The emergence of technologies has contributed to the improvement of communication and security, an example is Building Information Modeling (BIM) that allows the computational modeling of the work, which provides detailed data of its progress even in the design phase. This research aims to model a vertical work of social interest. The modeling was based on the standards defined by NR 18. After the modeling was completed, the results were compared with the real scenario of the construction, aiming to assess incompatibilities with what is required by NR. For modeling, the software Revit, MS Project, and Naviswork were used. It was concluded that the work did not meet some aspects required by NR, in addition to a lack of projects, design errors, and execution problems. As for the site managers, it was evaluated that the use of BIM in their construction sites could bring benefits to their work and facilitate decision making.

[Perceived effect of using BIM for improving construction safety](#)

A Bidhendi, H Arbabi, M Mahoud - *Asian Journal of Civil Engineering*, 2022

DOI : <https://doi.org/10.1007/s42107-022-00449-5>

Safety in construction projects is one of the critical factors in improving the performance of construction projects. One of the technologies in the construction industry is building information modeling (BIM), which can play a key role in improving safety. Therefore, the present study aimed to evaluate the perceived effect of using BIM in improving construction safety. The method of this research is a survey. The present study sample is 132 experts and engineers in Iran who have sufficient experience and expertise in construction and the use of BIM. The results of data analysis show that the use of BIM has a positive and significant effect on improving construction safety. On the other hand, BIM components significantly affect each of the safety components.

1.2 Conférence / ouvrage / thèse

[Real world lessons that can assist construction organisations in implementing BIM to improve the OSH processes \[PDF\]](#)

M Tender, P Fuller, A Vaughan, M Long, J Couto... - 4^o Congresso Português De Building Information Modelling, 2022, 13 p.

DOI : <https://doi.org/10.21814/uminho.ed.32.13>

Changing the way OSH management is performed with BIM is relevant. Several authors propose that real world cases need to be studied as there are few examples of studies covering BIM implementation for OSH. The UK PAS1192:6 introductory standard indicated some of the requisites and approaches to implementing BIM for OSH. Lessons from projects that have already implemented PAS 1192:6 will provide valuable inputs. This paper explores the stakeholders' perceptions about benefits and barriers of adoption of BIM for OSH purposes using examples from a complex large project (Thames Tideway Tunnel). The methodology adopted was a survey of 39 project participants. The study focused on the following areas: collaboration, risk assessment, training and awareness, inspection of workplaces, work accidents, budget control, error detection, liaison between logistics and productivity. The implementation of the new BIM based approach to construction shows that there is a very positive vision, namely in areas of risk assessment and training, in terms of the improvement of OSH management as well as of optimization of times and costs, better liaison between OSH and production, with increased production efficiency. This can potentially lead to a paradigm shift in OSH management in large projects. OSH management in this project.