Rapport de veille n° 55

BIM

31/01/2024

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.

Table des matières

1. Références anglophones

1.1 Articles scientifiques

Construction and Application of Safety Management Scenarios at Construction Sites
Q Yang, X Yan, W Chen, J Fan - Applied Sciences, 2024, 14(1)
DOI : https://doi.org/10.3390/app14010404
With the rapid development of the construction industry, there have been an uncountable number of damages caused by safety accidents at construction sites. Traditional safety management methods are no longer able to meet the needs of production. This paper presents the concept of constructing safety management scenarios for construction engineering sites. Using a production base project as a research case, it analyzes the natural and human factors involved in constructing spatial–temporal scenarios at construction sites. By employing a spatial–temporal overlay method to analyze multiple safety assessment indicators, a spatial–temporal safety management scenario for the production base project is established. Subsequently, BIM and GIS technologies are applied to perform a spatial–temporal simulation of the construction site safety management scenario. This process delineates safety and hazard areas across different construction phases based on time and spatial dimensions, enabling a comprehensive safety assessment of the construction site of the production base project. The study offers a reference and guidance for improving the level of safety management at construction project sites.

Digital Innovations for Occupational Safety: Empowering Workers in Hazardous Environments [PDF]
JE Dodoo, H Al-Samarraie, AI Alzahrani, M Lonsdale… - Workplace Health & Safety, 2024
DOI : 10.1177/21650799231215811
The quest to increase safety awareness, make job sites safer, and promote decent work for all has led to the utilization of digital technologies in hazardous occupations. This study investigated the use of digital innovations for safety and health management in hazardous industries. The key challenges and recommendations associated with such use were also explored. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, a total of 48 studies were reviewed to provide a framework for future pathways for the effective implementation of these innovations. The results revealed four main categories of digital safety systems: wearable-based systems, augmented/virtual reality-based systems, artificial intelligence-based systems, and navigation-based systems. A wide range of technological, behavioral, and organizational challenges were identified in relation to the key themes. Outcomes from this review can inform policymakers and industrial decision-makers about the application of digital innovations for best safety practices in various hazardous work conditions.

A Conceptual Framework for BIM-Based Site Safety Practice
S Hire, S Sandbhor, K Ruikar - Buildings, 2024, 14(1)
DOI : https://doi.org/10.3390/buildings14010272
With developments in Industry 4.0, there is growing momentum to adopt technology-assisted tools to support existing processes. Even though most construction processes are now computerized, safety procedures have not yet fully embraced the digital revolution. Building information modeling (BIM) is a platform that radically redefines the way in which businesses operate. Various past studies on the application of BIM in site safety mainly focus on using BIM for safety during construction and for a specific project type. The potential benefits of BIM for site safety have not yet been fully explored. The aim of the present study is to develop a BIM-based automatic safety checking (ASC) framework for an early identification of hazards. It includes safety checking

with codified OSHA rules, corrective actions, scheduling, and reporting in a virtual environment. All these steps are part of the risk lifecycle which is typically managed according to the phases of construction on a physical site. However, in the proposed framework, all these steps are managed at the preconstruction stage in a virtual environment. The major contribution of this study is the proposed framework that provides the conceptual foundation for early site safety management by identifying hazards at the design stage. The integration of a 3D model with codified OSHA standard safety rules ensures that the design is in adherence to safety rules and is rendered hazard-free for a pilot case.