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Investigating the Feasibility of Promoting Safety in Civil Projects by BIM System Using Fuzzy Logic

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Abstract : The construction industry has always been recognized as one of the most dangerous available industries, and the statistics of accidents and injuries resulting from it say that the safety category needs more attention and the arrival of up-to-date technologies in this field. Building information modeling (BIM) is one of the relatively new and applicable technologies in Iran, that the necessity of using it is increasingly evident. The main purposes of this research are to evaluate the feasibility of using this technology in the safety sector of construction projects and to evaluate the effectiveness and operationality of its various applications in this sector. These applications were collected and categorized after reviewing past studies and researches then a questionnaire based on Delphi method criteria was presented to 30 experts who were thoroughly familiar with modeling software and safety guidelines. After receiving and exporting the answers to SPSS software, the validity and reliability of the questionnaire were assessed to evaluate the measuring tools. Fuzzy logic is a good way to analyze data because of its flexibility in dealing with ambiguity and uncertainty issues, and the implementation of the Delphi method in the fuzzy environment overcomes the uncertainties in decision making. Therefore, this method was used for data analysis, and the results indicate the usefulness and effectiveness of BIM in projects and improvement of safety status at different stages of construction. Finally, the applications and the sections discussed were ranked in order of priority for efficiency and effectiveness. Safety planning is considered as the most influential part of the safety of BIM among the four sectors discussed, and planning for the installation of protective fences and barriers to prevent falls and site layout planning with a safety approach based on a 3D model are the most important applications of BIM among the 18 applications to improve the safety of construction projects.

Keywords : building information modeling, safety of construction projects, Delphi method, fuzzy logic
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