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IDENTIFICATION AND PRIORITIZATION OF SEISMIC RISKS IN URBAN WORN-OUT TEXTURES USING FUZZY DELPHI METHOD

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Abstract

Earthquake is a random natural phenomenon, which can occur at any time and location in a given seismic zone with any magnitude. The earthquake vulnerability in buildings and urban infrastructures is a key issue for crisis management. Therefore, an assessment model should be developed to identify and prioritize the significant seismic risks involved. In risk management, several numerical and descriptive phrases are used for risk identification and assessment. These phrases are estimative by nature and the accuracy of the estimations is vital in future decision-making in risk management. Fuzzy sets are a reliable tool in solving such problems and result in high level of accuracy through creating multiple-value logical models. The purpose of this study is to identify and prioritize the major risks associated with earthquakes in urban worn-out textures through the Delphi survey technique and fuzzy sets approach. The experts' opinions were collected using a fuzzy Delphi questionnaire with a five-point Likert scale of measurement method. Participants in the Delphi panel consist of 15 experts in the field of engineering. Important risks were determined and prioritized in the two phases of fuzzy Delphi method. According to the results, among the 19 identified major risks, road blockage and flood with defuzzification values of 0.917 and 0.583, respectively, have the highest and lowest risk potential respectively in Jalili Neighborhood's worn-out textures. It is expected that, because of the simplicity and the high accuracy for identification of the most vulnerable parts, this study provides scientific and useful guidance to urban managers and planners in decision-making and adopting the most appropriate strategies for mitigating damages and potential risks of earthquakes in urban worn-out textures.

Keywords: Fuzzy Delphi method, seismic risk management, urban risk management, urban worn-out texture, Iran

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