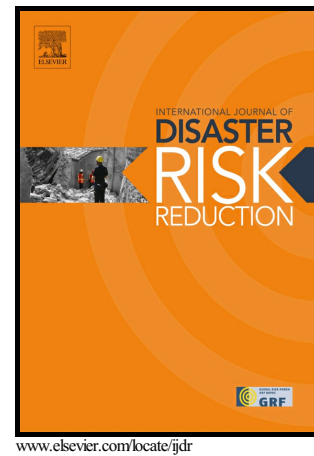


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Evacuation paths in historic city centres: a holistic methodology for assessing their seismic risk

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Abstract

During seismic emergencies in historical urban scenarios, evacuation paths can suffer significant damages and modifications due to both extrinsic (i.e.: building facing the path) and intrinsic (i.e.: pavements state, the presence of underground lifelines or hypogeum) vulnerabilities. Such damages and modifications can hinder the population's evacuation and the first responders' intervention, mainly because of paths' blockage or unavailability in emergency conditions. Paths' safety is additionally affected by populations' exposure conditions, also due to individuals' motion in the post-earthquake environment. Hence, an analysis of factors influencing the seismic risk of evacuation paths and a consequent evaluation of their safety during the emergency are thus desirable. This work aims to offer a preliminary and quick holistic method for seismic risk assessment and damage level estimation of possible evacuation paths. Firstly, data about safety influencing factors (i.e.: path use and exposure; geometric features; physical-structural features; extrinsic vulnerability; seismic hazard) are collected, associated to related weights and organized in risk indexes according to three calculation approaches. Then, according to real-world data, a correlation about path risk-damage levels is proposed with the additional purpose to evaluate the method capabilities in describing post-earthquake scenarios. Obtained results evidence that the proposed methodology could help safety designers in the seismic emergency planning of urban

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