

An Integrated Framework for Seismic Risk Mitigation Decision Making

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Abstract : One of the challenging issues faced by seismic retrofitting consultants and employers is quick decision-making on the demolition or retrofitting of a structure at the current time or in the future. For this reason, the existing models proposed by researchers have only covered one of the aspects of cost, execution method, and structural vulnerability. Given the effect of each factor on the final decision, it is crucial to devise a new comprehensive model capable of simultaneously covering all the factors. This study attempted to provide an integrated framework that can be utilized to select the most appropriate earthquake risk mitigation solution for buildings. This framework can overcome the limitations of current models by taking into account several factors such as cost, execution method, risk-taking and structural failure. In the newly proposed model, the database and essential information about retrofitting projects are developed based on the historical data on a retrofit project. In the next phase, an analysis is conducted in order to assess the vulnerability of the building under study. Then, artificial neural networks technique is employed to calculate the cost of retrofitting. While calculating the current price of the structure, an economic analysis is conducted to compare demolition versus retrofitting costs. At the next stage, the optimal method is identified. Finally, the implementation of the framework was demonstrated by collecting data concerning 155 previous projects.

Keywords : decision making, demolition, construction management, seismic retrofit

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