A advanced method of damage scenarios generation for seismic risk assessment in urban zones. Application to Motril city (Spain).

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A method of ultimate generation for the expected evaluation of seismic risk in single buildings and larger countries is presented. This method, called method of index of vulnerability, defines the seismic action in terms of macroseismic intensity and it characterizes the vulnerability of the buildings in function of an index. To estimate the expected damage for a defined intensity and an index of vulnerability given, semiempiric functions based in observed data of damage in the past earthquakes are employed. With this method is easy to incorporate complementary information of similar buildings, it does this methodology very efficient for the characterization of the vulnerability in countries. In the present work, first, the theoretical framework of the studies of seismic risk is presented, giving details about earthquake, building and damage function definition. Later, the application to Motril city (Spain) is developed. At least, two catastrophic earthquakes occurred in Motril (January 13, 1804 and December 24, 1884) in the past; moreover, the city is located in the border of Granada basin, the region with higher level of seismicity in Spain. A preliminary data base of this city has been obtained, containing parameters as the situation, the geometry, the structural and constructive features of the buildings and so on. With this method, two different seismic scenarios in function of macroseismic intensity are analyzed. The obtained scenarios of damage are consistent and they show the validity and robustness of this technique.