

Urban Seismic Risk Reduction in Algeria: Adaptation and Application of the RADIUS Methodology

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Abstract : The seismic risk to which the urban centres are more and more exposed became a world concern. A co-operation on an international scale is necessary for an exchange of information and experiments for the prevention and the installation of action plans in the countries prone to this phenomenon. For that, the 1990s was designated as 'International Decade for Natural Disaster Reduction (IDNDR)' by the United Nations, whose interest was to promote the capacity to resist the various natural, industrial and environmental disasters. Within this framework, it was launched in 1996, the RADIUS project (Risk Assessment Tools for Diagnosis of Urban Areas Against Seismic Disaster), whose the main objective is to mitigate seismic risk in developing countries, through the development of a simple and fast methodological and operational approach, allowing to evaluate the vulnerability as well as the socio-economic losses, by probable earthquake scenarios in the exposed urban areas. In this paper, we will present the adaptation and application of this methodology to the Algerian context for the seismic risk evaluation in urban areas potentially exposed to earthquakes. This application consists to perform an earthquake scenario in the urban centre of Constantine city, located at the North-East of Algeria, which will allow the building seismic damage estimation of this city. For that, an inventory of 30706 building units was carried out by the National Earthquake Engineering Research Centre (CGS). These buildings were digitized in a data base which comprises their technical information by using a Geographical Information system (GIS), and then they were classified according to the RADIUS methodology. The study area was subdivided into 228 meshes of 500m on side and Ten (10) sectors of which each one contains a group of meshes. The results of this earthquake scenario highlights that the ratio of likely damage is about 23%. This severe damage results from the high concentration of old buildings and unfavourable soil conditions. This simulation of the probable seismic damage of the building and the GIS damage maps generated provide a predictive evaluation of the damage which can occur by a potential earthquake near to Constantine city. These theoretical forecasts are important for decision makers in order to take the adequate preventive measures and to develop suitable strategies, prevention and emergency management plans to reduce these losses. They can also help to take the adequate emergency measures in the most impacted areas in the early hours and days after an earthquake occurrence.

Keywords : seismic risk, mitigation, RADIUS, urban areas, Algeria, earthquake scenario, Constantine

Conference Title : ICCEAE 2015 : International Conference on Civil, Environmental and Architectural Engineering

Conference Location : Paris, France

Conference Dates : December 30-31, 2015