Geophysical Research Abstracts
Vol. 20, EGU2018-1415, 2018
EGU General Assembly 2018

Hypothetical Damage Scenarios for Earthquakes Using Geographical Information system (GIS)

Jeevan Madapala (1) and Dilip Kumar Paul (2)

(1) Centre of Excellence in Disaster Mitigation and Management, Indian Institute of Technology Roorkee, India (jeevanm1.ddt2017@iitr.ac.in), (2) Emeritus Fellow, Department of Earthquake Engineering, Indian Institute of Technology Roorkee, India (dpaulfeq@iitr.ac.in)

Assessment and thereby quantification of physical risk, aids in developing scientific risk reduction strategies. The objective of the study is to quantify physical risk by generating hypothetical damage scenarios for earthquakes and thus provide an opportunity to enhance preparedness and mitigation strategies.
The trend of rapid urbanization and the pattern of development in the last several decades invite the notion of loss estimation whenever the context of a disaster presents itself. Taking cognizance of this necessity, the study develops a methodology which will aid in the estimation of infrastructural loss in case of an earthquake and coupled with supporting demographic data would also be able to estimate life loses.
All the fault lines in the area of interest are taken into account and the fault line with highest damage causing potential is considered. The future scope of this methodology lies in the fact that it gives the flexibility to consider any or all the fault lines, as the case maybe. Earthquake parameters such as magnitude, location, directivity, etc., derived from the considered fault line are used as inputs of this methodology. Attenuation relations, specific to the area of interest is used to generate isoseismal lines which are plotted to generate earthquake intensity map. This map is than overlayed on a map which has the latest census data of the nation such as population and housing data. Together, they become the damage scenario map. Numerical analysis based on damage scenario map gives quantified value of infrastructural loss subjected to different grades of damage and even an approximate number of lives lost, if the earthquake occurs during favorable or unfavorable time.
The damage scenario maps aids the relevant personnel and administration to plan ahead in matters like evacuation procedure, evacuation route, resource allocation, etc.,
The versatility of the methodology enables it to be easily and efficiently imitated for any hazard, and not be restricted to earthquakes alone.