

Worldwide GIS Based Earthquake Information System/Alarming System for Microzonation/Liquefaction and It's Application for Infrastructure Development

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Abstract : One of the most frightening phenomena of nature is the occurrence of earthquake as it has terrible and disastrous effects. Many earthquakes occur every day worldwide. There is need to have knowledge regarding the trends in earthquake occurrence worldwide. The recoding and interpretation of data obtained from the establishment of the worldwide system of seismological stations made this possible. From the analysis of recorded earthquake data, the earthquake parameters and source parameters can be computed and the earthquake catalogues can be prepared. These catalogues provide information on origin, time, epicenter locations (in term of latitude and longitudes) focal depths, magnitude and other related details of the recorded earthquakes. Theses catalogues are used for seismic hazard estimation. Manual interpretation and analysis of these data is tedious and time consuming. A geographical information system is a computer based system designed to store, analyzes and display geographic information. The implementation of integrated GIS technology provides an approach which permits rapid evaluation of complex inventor database under a variety of earthquake scenario and allows the user to interactively view results almost immediately. GIS technology provides a powerful tool for displaying outputs and permit to users to see graphical distribution of impacts of different earthquake scenarios and assumptions. An endeavor has been made in present study to compile the earthquake data for the whole world in visual Basic on ARC GIS Plate form so that it can be used easily for further analysis to be carried out by earthquake engineers. The basic data on time of occurrence, location and size of earthquake has been compiled for further querying based on various parameters. A preliminary analysis tool is also provided in the user interface to interpret the earthquake recurrence in region. The user interface also includes the seismic hazard information already worked out under GHSAP program. The seismic hazard in terms of probability of exceedance in definite return periods is provided for the world. The seismic zones of the Indian region are included in the user interface from IS 1893-2002 code on earthquake resistant design of buildings. The City wise satellite images has been inserted in Map and based on actual data the following information could be extracted in real time: • Analysis of soil parameters and its effect • Microzonation information • Seismic hazard and strong ground motion • Soil liquefaction and its effect in surrounding area • Impacts of liquefaction on buildings and infrastructure • Occurrence of earthquake in future and effect on existing soil • Propagation of earth vibration due of occurrence of Earthquake GIS based earthquake information system has been prepared for whole world in Visual Basic on ARC GIS Plate form and further extended micro level based on actual soil parameters. Individual tools has been developed for liquefaction, earthquake frequency etc. All information could be used for development of infrastructure i.e. multi story structure, Irrigation Dam & Its components, Hydro-power etc in real time for present and future.

Keywords : GIS based earthquake information system, microzonation, analysis and real time information about liquefaction, infrastructure development

Conference Title : ICCSEE 2015 : International Conference on Civil, Structural and Earthquake Engineering

Conference Location : Prague, Czechia

Conference Dates : March 23-24, 2015