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A GIS-based Simulation System of Seismic Disasters for Infrastructures in Urban Areas

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A strong dependence on functions from infrastructure system is one of the distinctive characteristics in urban area. Infrastructure system includes water supply, power-transmission, telecommunication, transportation, gas-oil-supply, sewage and heat-supply, medical-rescuing system, public security system, they are necessary for our daily life. Earthquake disaster of infrastructure system brings not only property losses, but also functional damage to human activities and socioeconomic losses, even casualties. Besides during the earthquake invading it is also very important to keep infrastructure system safety in other conditions. Because of different structural patterns and performance characteristics existing among infrastructure system, identification the weakness of infrastructure system is very difficult, however, some new methods on infrastructure earthquake risk assessment are studied. In this paper, a seismic disaster simulation system for infrastructure in urban area based on geographical information system is presented. This system can be used to simulate earthquake hazard distribution, compute the seismic vulnerability of the main infrastructure systems in urban area, and simulate the emergency rescuing procedure. Function, structural design and design criterion, main contents, and update technique are introduced in this article. As an illustration, an ongoing simulation system is given to check it validity and reliability.