

عنوان مقاله:

PROBABILISTIC SEISMIC DAMAGE ASSESSMENT FOR URBAN TRANSPORTATION NETWORK

محل انتشار:

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خلاصه مقاله:

In this paper an analytical procedure is proposed for probabilistic assessment of seismic damages and consequence disruptions to urban transportation network following earthquakes. In the methodology proposed here, seismic damage to urban transportation network and consequence road congestions are modelled based on falling debris from damaged building stocks as well as disruption caused by other road structures such as bridges. Monte Carlo simulation process and logic tree algorithm are taken into account to model uncertainties associated with different factors controlling ground motion estimation, assessment of physical damages to building stocks and road structures and also estimation of falling debris and consequence congestion stages. In this paper, synthetic earthquake catalogues representing long term seismicity and attenuation functions are used to model probabilistic strong ground motions impacting buildings and road network. The process involves simulation of damages to buildings and bridges, using many synthetically generated earthquake scenarios. Each earthquake scenario results in probabilistic and spatial distributions of damages to building surrounding urban roads networks and bridges. Volumes of falling debris are estimated for each group of residential and commercial buildings, based on building types and building damage stages. Similarly, the extent of debris spreading out on the roads are estimated based on damage pattern from previous earthquakes and where necessary judgment. A GIS-based computer tool has been designed and developed in this study which consists of modules for analytical and probabilistic analyses as well as GIS functionality for spatial analyses and data visualization. To test the model, urban road network and building stocks for a district in the city of Tehran is used and results in term of maps showing seismic induced road closure are presented at the end of this paper.

کلمات کلیدی:

Lifeline system, Urban road network, Risk assessment, Seismic hazard

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