



Rapid assessment and uncertainty analysis of seismic fatality based on scenario analysis

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The rapid assessment of seismic fatality with the seismic parameters is the core basis for emergency response. However, there are so many factors affecting the rapid assessment process, it's too difficult to get the accurate assessment results. Therefore, the key path to solve this problem is using the post-earthquake limited information to rapidly assess the fatality and describe the uncertainty of the assessment result. This study took 214 destructive earthquakes in China from 1970 to 2015 as samples. As with the statistical analysis finds magnitude, intensity and the initial time are main parameters affecting the seismic fatality. Based on the main parameter to construct the basic earthquake emergency scenarios, and sort the samples into the corresponding scenario according to its characteristics. Considering the small sample size problem under each scenario and the uncertainty in process of the seismic fatality assessment, we compute expected mortality rate and the probability of mortality rate interval under each scenario with the information diffusion theory. Finally, the estimated fatality was calculated based on the probability of mortality rate and victims. Based on the above method, the earthquake which happened in China recent years were used to verify the model's accuracy, the result shows that the error of the rapid assessment model is less than 30%, it meets the requirement of rapid assessment which proposed by Ministry of Civil Affairs of the People's Republic in China. And 20% samples were randomly selected to verify the accuracy of the uncertainty interval, more than 80% of the validation samples are in the high probability interval, it means the model can take account of the extreme events. The rapid assessment model of seismic fatality based on scenarios analysis has high accuracy and better applicability, it can provide theoretical basis for emergency response of post-earthquake.