



Earthquake Hazard and Risk Assessment for Turkey

Mine Betül Demircioğlu, Karin Sesetyan, and Mustafa Erdik

Bogazici University Kandilli Obs. & Earthquake Res. Ins., Earthquake Engineering, Istanbul, Turkey
(betul.demircioglu@boun.edu.tr)

Using a GIS-environment to present the results, seismic risk analysis is considered as a helpful tool to support the decision making for planning and prioritizing seismic retrofit intervention programs at large scale. The main ingredients of seismic risk analysis consist of seismic hazard, regional inventory of buildings and vulnerability analysis.

In this study, the assessment of the national earthquake hazard based on the NGA ground motion prediction models and the comparisons of the results with the previous models have been considered, respectively. An evaluation of seismic risk based on the probabilistic intensity ground motion prediction for Turkey has been investigated. According to the Macroseismic approach of Giovinazzi and Lagomarsino (2005), two alternative vulnerability models have been used to estimate building damage. The vulnerability and ductility indices for Turkey have been taken from the study of Giovinazzi (2005). These two vulnerability models have been compared with the observed earthquake damage database. A good agreement between curves has been clearly observed. In addition to the building damage, casualty estimations based on three different methods for each return period and for each vulnerability model have been presented to evaluate the earthquake loss.

Using three different models of building replacement costs, the average annual loss (AAL) and probable maximum loss ratio (PMLR) due to regional earthquake hazard have been provided to form a basis for the improvement of the parametric insurance model and the determination of premium rates for the compulsory earthquake insurance in Turkey.