



## Vulnerability of Buildings for Tbilisi City

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The risk always exists when cities are built on. Population growth in cities and urbanization in seismic-prone zones leads to infrastructure expansion. The goal of the society is to construct earthquake resistant infrastructure and minimize the expected losses. Work presented here was initiated by working package wp5 of regional projects EMME (Earthquake Model for Middle East Region). The primary scientific objective of this work was to combine analysis of the contemporary elements at risk inventories, seismicity and vulnerability to assess seismic hazard and seismic risk for the capital of Georgia – Tbilisi. Creation data bases (inventory) of elements at risk (building population) in GIS system were the first step of this work. Creation inventory databases are based on two approaches. One is monitoring and second is analyses of photos and aerial photos by expert. During the monitoring were realized that we have many cases of roof types, materials and functionality. For roof type, materials and functionality special program was prepared in GIS that allow manually create these ones in databases and then assigned to the building. Depending the choice of these ones, the program automatically assigned code to the building, finely on the bases of this codes program will be prepared that automatically calculate the taxonomy of the building. The European building taxonomy classification proposed in Giovinazzi (2005) were used for these building and taxonomy classification was done. On the bases of empirical data that was collected for Racha earthquake ( $Ms = 6.9$ ) on 29 April of 1991 and Tbilisi earthquake ( $Ms = 4.5$ ) on 25 April of 2002 some intensity based vulnerability study were completed and the regional vulnerability factors were developed for these typologies.