



Informational database methodology for urban risk analysis. Case study: the historic centre of Bucharest

I. Armas (1) and S. Dumitrascu (2)

(1) (iuliaarmas@yahoo.com), (2) (dumitrascu.silvia@gmail.com)

The urban environment often deals with issues concerning the deterioration of the constructed space and the quality of the environmental factors, in general terms meaning an unsatisfactory quality of life. Taking into account the complexity of the urban environment and the strong human impact, this ambience can be considered the ideal place for a varied range of risks to appear, being favoured by the external interventions and the dynamics of the internal changes that occur in the urban system, often unexpectedly. In this context, historic centre areas are even more vulnerable because of the age of the buildings and their socio-cultural value.

The present study focuses on the development of a rapid assessment system of urban risks, putting emphasis on earthquakes. The importance of the study is shown by the high vulnerability that defines urban settlements, which can be considered socio-ecological systems characterized by a maximum risk level. In general, cities are highly susceptible areas because of their compactness and elevated degree of land occupancy, the Bucharest municipality being no exception. The street and sewerage networks disorganized the natural system resulted from the evolution of the lake-river system in Superior Pleistocene–Holocene and the intense construction activity represents a pressure that hasn't been measured and that is in need for a methodological interdisciplinary approach. In particular, the specific of Bucharest is given by the seismic risk based on an explosive urban evolution and the advanced state of degradation of the buildings. In this context, the Lipscani sector from the historic centre of the capital city is a maximum seismic vulnerability area, this being the result of its location in the Dâmbovită River meadow, on the brow and 80 m terrace, but more precisely because of the degradation of the buildings that cumulated the effects of the repeated earthquakes. The historic centre of Bucharest has not only a cultural function, but is also a very populated area, this being factors that favour a high susceptibility level. In addition, the majority of the buildings are included in the first and second categories of seismic risk, being built between 1875 and 1940, the age of the buildings establishing an increased vulnerability to natural hazards.

The methodology was developed through the contribution of three partner universities from Bucharest: the University of Bucharest, the Academy for Economic Studies and the Technical University of Constructions. The method suggested was based on the analysis and processing of digital and statistical spatial information resulted from 1:500 topographical plans, satellite pictures, archives and historical maps used for the identification of the age of the buildings. Also, an important stage was represented by the field investigations that resulted with the data used in the assessment of the buildings: year of construction, location and vicinity, height, number of floors, state and function of the building, equipment and construction type. The information collected from the field together with the data resulted from the digitization of the orthophotoplans were inserted in ArcGIS in order to compile the database. Furthermore, the team from the Cybernetics Faculty developed a special software package in Visual Studio and SQL server in order to insert the sheets in GIS so that they could be statistically processed. The final product of the study is a program that includes as main functions editing, the analysis based on selected factors (individual or group) and viewing of building information in the shape of maps or 3D visualization.

The strengths of the informational system resulted are given by the extended range of applicability, the short processing period, accessibility, capacity of support for a large amount of information and, thus, standing out as an adequate instrument to fit the needs of a susceptible population.