
**Analysis of Seismic Vulnerability Factors in Urban Old Texture with the
Approach of Earthquake Crisis Management
(Case Study: Sirius Neighborhood)**

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Extended abstract

Introduction

During the twentieth century, more than 1100 devastating earthquakes occurred in different parts of the world and left more than 1.5 million people dead that 90% was mainly caused by the collapse of the not secure buildings. This research is an analysis - heuristic investigation in methodology and according to nature and inability to control behavior of the variables effective in the problem, this is non-experimental study. An obvious example is Japan that experiences annually several events more than seven in Richter scale. In these events, effects of earthquakes on structures and vulnerable people were very partial and limited. According to the urban infrastructure, these events cannot cause the crisis and disruption in urban systems. This study intends to identify and develop relationships with urban planning and disaster management of earthquake in order to reduce seismic vulnerability of old texture in Sirius Neighborhood of Tehran Municipality, District 12. Through Seismic Vulnerability Analysis of urban old- texture, this situation emphasize on the role of urban planning indicators for the structural parameters of the programs to deal with the earthquakes.

Methodology

This research is an analysis - heuristic investigation in the nature of research methodology. According to nature and inability to control behavior of the effective variables, this study has a non-experimental method. Data collection method has been document and literature review in the first case and review of literature on the subject of earthquake damage in urban areas, especially the old-textures.

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Results and Discussion

With the importance of the seismic vulnerability assessment of the cities in geography and urban planning issues, this study tried to use AHP method. The appropriate predictions of the seismic vulnerability of cities using spatial data, a description of behavioral and structural components used to determine the effect of the vulnerability. Using analytical capabilities of GIS representation and earthquake scenarios in different intensities, we consider micro-zonation damage of buildings and human casualties in the neighborhood of cirrus. In this paper, a hierarchical model is used to evaluate the relative importance of the evaluation factors to determine vulnerability. Then, the relationships and various models of vulnerability and Geographic Information Systems (GIS) are used to assess the seismic vulnerability for Cirrus neighborhood.

To evaluate the vulnerability for this study, the weights of criteria using AHP were calculated for each of the weights using GIS layers of the application. It has prepared the vulnerability map of the overall neighborhood Cyrus.

Since the evaluation criteria measured with different scales are presented, they can be converted into a common scale, in need for standardization. In addition, several methods such as fuzzy theory "scale linear transfer function", "function (value)", and "self-insuring possibilities" can be used to standardize the results of AHP modeling. According to the wide range of fuzzy logic membership functions presented in comparison with other standard methods, this model can be a very strong argument for using a method similar to human descriptions and tentative decisions in use of data for approximation. By using analytical capabilities of GIS representation and earthquake scenarios in different intensities, we consider the micro-zonation damage of buildings and human casualties in the neighborhood of cirrus. In this paper, a hierarchical model is used to evaluate the relative importance of the evaluation factors to determine vulnerability. Fuzzy sets are applied in a variety of functions such as linear threshold function, J-shaped and S-shaped. In this study, according to the nature and criteria, we used layers of linear threshold function.

Conclusion

In this study, each of the criteria and sub criteria are examined separately and their individual relationship for the process was clearly explained. Increase in the value of the variables such as population density, age of building, and number of floors is observed. In contrast, increase in the amount of variables such as distance to the fault surface components, based on the width of the access road, consistent user of the neighborhood, and quality of buildings reduce the vulnerability and vice versa. Each of the above mentioned variables have contributed to the vulnerability, but each has a level of importance compared with other factors. They are individually significant and calculate coefficients using the AHP method and Expert Choice. Review and decision making based on one factor is not always consistent and the importance of each of them is to make better decisions. Therefore, the analysis factors in an acceptable level show vulnerability against earthquake hazards due to all the factors. Finally, we can say that the scope and coverage of the population with high and very high vulnerability (in the central part and the core tissue) was severe. This indicates the high susceptibility of all factors of earthquake.

Keywords: crisis management, old- textures, physical and urban planning indicators, seismic vulnerability indicators, Sirus Neighborhood.