The Modeling of Human Mortality in Nightly Earthquake Scenario in Zone 1 of the City of Ahwaz

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1. Introduction

Usually the major human casualties caused by the earthquake, are the damages related to buildings and structures. According to estimates the more than 75 percent of deaths and casualties began to collapse (Lantana, 2008). Whereas the damage and human losses range from minor injuries to death. These two factors are important characteristics of intensity earthquake (Coburn et al., 2002). Earthquake vulnerability of buildings can be termed as mount of damage induced in the building due to earthquake. Vulnerability is expressed on a scale of 0 to 1, where 0 is no damage and 1 defines complete destruction. It can be expressed in various terms like vulnerability tables, fragility curve, response curves, etc. Vulnerability of a building is determined by factors like shape of building, type of building, its construction material, height, design and structure. A building behaves differently based on different intensities of ground motion.
Seismic simulations allow scientists to better understand the distribution of shaking and damage that can accompany earthquakes, including possible future "scenario" earthquakes. The simulations are only as valid as the elements going into the simulations, such as the source and subsurface models. Thus, the recent earthquake provides data to validate methods and models.

2. Materials and methods

Regarding the topic of research, area of study and complicated existence of city as a spatial and social system, use of different methods and techniques with title of Compound Method is essential. In this study, indicators were extracted by Delphi technique and the studying of records. After weighting of parameters by FUSSY-AHP, the selected indicators were converted to distances maps in GIS-SPATIAL ANALYSIS EXTENTION software. Finally, the final map of permeability area in Zone 1 of Ahwaz mega city Were prepared.
The objectives of the study include the following:
To examine the nature and types of road closures in Zone 1 of Ahwaz.

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To compute the level of withdrawal of public access in the enclosed neighborhoods of Zone 1 of Ahwaz facing with hazards.
The study area of research is Ahwaz**.** Ahwaz is a city in the south of Iran. In the 2006 census, its population was 1,432,965, in 796,239 families. Ahwaz has the world's worst air pollution according to a survey by the World Health Organization in 2011. Ahwaz is built on the banks of the Karun River and is situated in the middle of Khuzestan province, of which it is the capital and most populous city. The city has an average elevation of 20 meters above sea level. Ahwaz, being the largest city in the province, consists of two distinctive districts: the newer part of Ahwaz which is the administrative and industrial center, which is built on the right bank of the Karun river while residential areas are found in the old section of the city, on the left bank.

3. Result and discussion

To calculate the human toll, eight criteria were used in the fuzzy logic model. Based on the findings, District 4 is known as the most vulnerable region in the face of a possible earthquake. In this district, mortality potential of accessory buildings and structures loss was predicted about 2579 person.
An important aspect of preparedness for an earthquake is evaluating the building stock particularly in terms of structural vulnerability. While Iran has a National Building Code that takes into account earthquake resistance in the design of buildings, the vast majority of properties do not meet those standards, exposing the occupants to the risk of injury or death arising from the building collapsing in the event of a major earthquake. According to the research area 4 as the most vulnerable region in face of an earthquake is possible. In this area, mortality potential loss of structural buildings and equipment of 2,579 people have been predicted. Old, unstable materials and high density construction are of the most important reasons for this pattern of vulnerability. In this connection, District 5 with low density and new tissue has shown the least amount of casualties. Moreover, the distribution percentage of type of buildings out of 50 samples surveyed is then extrapolated to total number of buildings present in that particular ward.

4. Conclusion

According to research findings in the fuzzy model a major way in which loss of life and injury can be reduced in a major earthquake is by undertaking a nonstructural vulnerability assessment. Based on the findings derived from the analysis of spatial and statistical modeling on the model Coburn, Earthquake Crisis management priorities for reducing the amount of probable losses in the earthquake area is obtained. This involves a visual inspection of each room of a property to identify furniture and fittings that could topple or break in the event of an earthquake and cause injury and/or restrict pressure on external resources. The results derived from the analysis of spatial and statistical modeling based on Coburn, priorities earthquake crisis management to reduce potential earthquake zone 1 of Ahwaz was obtained.

Key words: Ahwaz, Vulnerability assessment, Earthquake simulations

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