

Received: 28 December 2016 • Accepted: 21 February 2017

Research

doi: 10.15412/J.JCEMA.12010101

A Study on Vulnerability of Urban Neighborhoods to Earthquake (Case Study: Farahzad Neighborhood, Tehran)

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ABSTRACT

Iran is considered as one of the most seismic countries in the world and its cities have been frequently damaged by this natural phenomenon. Tehran, as the first metropolis of the country, is no exception to this, and prone to damage also due to its compactness, and being located on three active faults (Mesha fault, North Tehran fault, Rey fault). If activated, Mesha fault, North Tehran fault and Rey fault will destroy 20%, 35% and 55% of the city, respectively. Farahzad neighborhood in northern Tehran is one of the most seismic parts of Tehran metropolis. Hence, the main objective of this study is to investigate the seismicity of the neighborhood in terms of the risk of earthquakes. For this purpose, descriptive analysis, GIS software and Euclidean distance analysis were used. The results of this study showed that 57 hectares of Farahzad (136 hectares) with a relative area of 41% are located in a zone with a high earthquake risk (less than 400 m to the fault line). The area with a high seismic risk (400 to 800 meters) covers an area of 39 hectares, 29 percent of the total neighborhood. Also, 20 hectares of total residential buildings (34 hectares), with a relative area of over 58 percent, are located in a zone with a high risk of earthquakes.

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1. INTRODUCTION

Natural disasters are one of the environmental phenomena that can occur in any part of the planet, depending on the type of environment. These incidents due to their devastating effects always threaten urban settlements. Modern cities in different parts of the world are always at the risk of natural disasters for a variety of reasons, including the lack of suitable location, inappropriate physical development, non-compliance with applicable standards, and the like. One of the dangers that threaten many cities in the world, including our country, is earthquake. In this regard, the United Nations (1992) defines the term "disaster" as "a serious disruption to the functioning of the community and humanitarian or environmental damage beyond the ability of the community." Crisis management is defined as "a process or strategy that is defined for any catastrophic event" (1).

Earthquake is one of the most important natural disasters, an earthquake causes the most severe human and structural vulnerability. Over a decade, around 200 severe earthquakes occur around the world. As the world's population is growing, the vacant areas have rapidly assumed residential uses and, as a result, the magnitude of the phenomenon of earthquake-caused hazards has increased. Iran is considered as one of the most seismic parts of the world and its cities have been damaged frequently due to this natural phenomenon. Tehran, as the first metropolis of the country, is no exception to this, and prone to damage also due to its compactness, and being located on three active faults (Mesha fault, North Tehran fault, Rey fault). If activated, Mesha fault, North Tehran fault, Rey fault will destroy 20%, 35% and 55% of the city, respectively. Farahzad area in northern Tehran (district 2 of Tehran municipality) is no exception. Due to its