Abstract:

Iran is among the countries that abundant human and financial losses annually through natural disasters (earthquake). The country is located on the seismicity belt. Through studying land zoning map and estimating the relative risk of earthquake in Iran and also with comparing the distance of the places from the possible sources of seismic and considering movement a part of them, all the scope is divided into six very high vulnerable, high vulnerable, fairly high vulnerable, medium vulnerable, fairly low vulnerable, and low vulnerable areas. Within the city of Tabriz, major faults have been located: Tabriz thrust fault Shml, Tasuj thrust fault, Sharafkhaneh fault, Soofian Fault. With regards to the available information, Tabriz is the only city in the country that is considered as highly risked cities in terms of earthquake. The rapid of special and skeletal development, especially Tabriz, Adjacent towns and neighboring cities such as Heris, Bostan Abad, Oskoo, Sofian, due to skyrocketing population and growing demand for housing and construction of residential, service, commercial, and industrial buildings without observing safety tips highlights the probable losses. Recognizing body of knowledge of the earth which is the outward and inward shape of the earth is very important for locating and planning cities and towns from various perspectives. Recognizing the natural features of the area can be very effective in determining safer places for building important structures, public places, and also city development and building cities. With regards to the experts’ warnings, the development of the city is prolated through north and east north of city (Tabriz plain adjacent fault) and population near to 400000 lives are at risk.

Keywords: Land use, earthquake, zoning, Urban and rural settlements

Introduction

Land use of the province is a national land use and the roles and duties of the province are recognized in land use pattern (Momtgomervy, 2003). Land use is considered as regulating human relations and activities in the holistic approach and long-term programming. Land uses assure the usage of the resources of the earth and lead it in a way that it can provide the need for recent and future generation (www.un.org/2003). In most of the cases, land uses determine the ability of each part of the earth for a specific application (Asadian, 2000) Thus, it is inevitable for effective management and ensures lasting ecological, economic and social systems (Bryan, 2003). In subtract for estimating and determining ecology powers and also determining high vulnerable of the province and drawing zoning of province in relation to earthquake danger have been studied. Estimating the spatial distribution of urban and rural center of the province, indicates that much of the population is located in the west half of the province. Settlement of the population in geographic area of province have been affected by natural conditions, water resources and fertile. 85 percent of urban society is settled on the west half. On the other hand, from rural population, this half has allocated 50% of the population (Zali, 2005:32).

Earthquake and its origins: The earthquake is the rapid movement of Earth's crust. During an earthquake, a sudden release of energy stored happens in rocks and moves around as waves. When these waves come to the surface of the earth cause vibration and sometimes demolition of buildings, creating fault slip, and other phenomena. Among various theories which have been put forwarded as the main reason for earthquake, plate tectonics theory is more acceptable seismologists (Zareh, 1379, 32).
Discussion

Seismicity and Seism tectonics of Iran:

The Iranian plateau is the most seismically active regions in the world. This region is characterized by earthquakes in the continental crust. Iran has been introduced as far different zones of seismicity by various researchers, but the investigations of Iran’s earthquakes have revealed that there is a long way from a detailed seismological and seism tectonic zoning. Iran is placed in the middle of the Alpine- Himalayas belt and is effected under the latest Alpine ergogenic movements. On the other hand, Iran is located in a zone pressure between the Arabian plate to the south of the West that puts stress on Iran permanently and the balance in the North and North West and South of the country makes small and big earthquakes happen as a result of this.

Azerbaijan Seism tectonics:

While the geologic ranges are not divided geographically, range of geologic mapping in the North West of the country is located in Central Iran and is rolled out in Eastern regions of Turkey and the Caucasus is called Azerbaijan and is discussed. In sum, two active Seism tectonic ranges will affect Azerbaijan. These processes are consisted of: Zarineh rood line structure, Arak and Bakhtari limit, Embayment area lakes, in the north of Uremia Lake, this line hop with Tabriz- Zanjan structure line. These two lines create a contour deformation zone that is sinking of the twitch - the tangential CCW, the lake area. In this area, Sahand volcanic system is located between Zarine- Arak structural contour lines. In the southern area of this line, Piranshahr fault with tensional mechanisms is one of the few active tensional faults in Iran (Ab Mantage yee Azerbaijan, sixth edition) (Mokhtari, 2005)

Tabriz north and northeast fault, is an important part of Tabriz-Zanjan structural line which is prolonged about 200 kilometers from south Marand Tabriz northeast to Bostanabad and also its southeast. The important historical earthquakes which caused total destruction of Tabriz (at least 12 times) are addressed to this fault. 1099 solar year (1721) and 1158 solar year (1780) were the latest important destructive events which happened as the result of mentioned directed rupture.

Seismic zoning in the land use of the area, determining the applied urban strategies, locating important installation and vital arteries, designing and performing structures, and crisis management are used at the time of earthquake and other similar cases. Damages and injuries to the buildings and municipal utilities as the result of the destructive earthquakes are primarily a function of the geological and geotechnical conditions of the alluvial bed. The main axis of the Geological Survey seismic zonation project forms a strong ground movement. In these studies the seismicity and earth quake status is used as input parameters bedrock that can be used as seismicity and tectonics worth reset status. Of course attention should be paid that in the 2800 earthquake standard, Iran has been mentioned as 4 danger zones which is divided into highly dangerous, average dangerous and low dangerous areas (Building design regulations).
The methods of Seismic Zoning are used in three ways.

A) Empirical Greens Function Method
B) Empirical Method
C) Stochastic Simulation Method

Risk analysis of possible methods

1-1) Linear springs are marked on the ground at a minimum distance of 100 kilometers.

1-2) Gutenberg – Richter and determining the magnitude and probability density function curve relationship

\[ \text{Gutenberg – Richter Ln (N)} = a - Bm \]

Magnitude of the probability density function is obtained as follows. B) (M-m)

1-3) Magnitudes are divided to the distance equal for M5 / 0.

1-4) PGA values for the magnitude and distance calculations (Each episode Springs Utilities) different for using suitable lowering relationship used for median values of magnitude and distance values PGA

1-5) To estimate PGA follow bigger than a specific acceleration for specific MR, assuming that the acceleration is specified in a particular area, for example \( a1 > a > a2 \) is as follow.

\[
A = a1 \\
\quad a = a1 + a \\
\quad a = a + ma = a2
\]

Evaluation of high-risk areas in relation to faults and earthquakes:

Fault is discontinuous surface that separates two sets of stone and has a displacement. About 90% of discrete levels of earthquakes are the result of tectonic events that can be defined simply as movements of faults. 10% left of the volcano is related to the subsidence of underground caves and human activities (Management and Planning Organization of Azerbaijan sharghi, 2001).

Active fault is a fault that is geological evidence with at least one movement in 30000 year or two movements in 50000 in the previous year. The active faults of Azerbaijan (Quaternary faults) is consisted of:

1- North Tabriz 2- Tasuj
3- Mianeh 4- Shekar yazi
5- Ahmad abad 6- Mazraeh
7- Sharafkaneh-sufian 8- South mishu
9- Barkashlu 10- Kenborchay
11- Salmas 12- Nouth and South Bozgush

Of course if we want to investigate the zoning of the province more accurate, we should involve the fault map of the neighboring province of other countries.

Spatial analysis of earthquake danger in population and economic centers of the province: During an earthquake, different factors damage the human society which the most important once are as follow:

1- Tangible loss
Direct damages such as: Human fatalities and disabilities destroyed and damaged buildings, installations, and lifelines.
Indirect damages such as: Temporary cessation of communication and dissolution of ground transportation, cutting off water, gas, electricity and telephone, some of lifelines, cost of treatment and services compensation)(Physics Geology.

2- Insensible losses (Limited investment and lack of confidence in the area prone to flooding, interest to migration and due to earthquake damage and threats on drop zone, hamper economic growth and development, Long-term mental health problems).

With regards to the Earthquake hazard zonation map it is observed that populated cities like Tabriz, Bostan Abad, Tasuj in the highly dangerous zone which are dense in terms of population and economics. This situation, cause a great potential in these cities that need deep and professional, effective and useful solutions. Also in cities in Marand, Shabestar, Soofian, Oskoo, Khorosroshahr, Sarab, Heriss, Kaleibar, and Horand are located in highly dangerous areas which need to be essential programs to concur with probable crisis in future. Azarshahr, Mianehe, Hashtrood are located in average dangerous location in comparison to the above mentioned cities. Also, Ahar, Jolfa, Varzegan, Bonab, Maraghah, and Malekan are in more safe situations in comparison to other cities.

Conclusions: based on the mentioned claimant it can be concluded the main purpose of the land use, is the wise and stable management of the environment and its facilities to remove spiritual and material needs. With regards to the vulnerability of human settlements in the face of natural disasters such as earthquake and landslides and concentration of population economical activities in special areas, there is a need for land use for organizing human environment and also preventing specific domains. Zoning of land use, determining urban strategy to locate a major facility structures is used for managing crisis and similar cases. As is clear, 90% of damages and the injuries to the buildings and urban installation are dependent on geological and geotechnical conditions.

Tabriz is considered as one of the most dangerous cities with four faults inside the city, one of them is a fault with 90 km, and is threatening Tabriz with horrible earthquake which may cause financial losses and fatality. Also, due to the fact that Tabriz is a populated city and most of the industries are located in in Bostan abad and Tasuj, there is a need to pay attention to land use and also locating essential experiments. With regards to the semiotic of Tabriz the development of the city toward North and Northeast should be prevented. However, as the data revealed a population near to 40000 people are living near the fault in Baghmishe and Roshdieh. It is an evidence that proof the lack of enough study, research and experiments in this area which may cause financial loss and fatality.

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