

SEISMIC HAZARD ASSESSMENT OF AHWAZ AND BEHBAHAN CITIES BY STATISTICAL, DETERMINISTIC AND PROBABILISTIC METHODS

Seyed Soroush ENFERADI

*M.Sc. Student, Institute of Geophysics, University of Tehran, Iran
soroush.enferadi@ut.ac.ir*

Seyedeh Marziyeh AHMADPOUR

*B.Sc. Student, Shahid Chamran, University of Ahwaz, Iran
sm.ahmadpour@yahoo.com*

Keywords: Statistical seismic hazard assessment, Deterministic seismic hazard assessment, Probabilistic seismic hazard assessment, Ahwaz region, Behbahan region

Although with current human knowledge, it is impossible to prevent or even predict the occurrence of the natural phenomenon of earthquakes, but by designing resistant buildings against earthquakes as well as retrofitting existing buildings, earthquake hazards can be minimized. The prerequisite for safe and robust design of buildings is Seismic hazard assessment. In this reports, the seismic hazard assessment for Ahwaz and Behbahan cities is done with three statistical, deterministic and probabilistic methods. The city of Ahwaz is enclosed between 31.30° north latitude and 48.65° east longitude and the city of Behbahan is enclosed between 30.59° north latitude and 50.23° east longitude.

In the Statistical Seismic Hazard Assessment, the basis of the work is that by using the statistics of the earthquakes occurring around a site and choosing a attenuation relationship, the probability of occurrence of earthquakes with a certain magnitude in the future is estimated, and the recurrence interval of this earthquake as well as seismic parameters are determined. First, the catalog of historical data (before 1900) and instrumental data (after 1900 AD) were determined. Then, faults of this region were identified and determined by using ArcGIS software and a seismotectonic map of the region's was obtained. Next, the studied area was divided into three seismic sources and the seismic parameters of the area were obtained by using the homogeneous catalog (Zmap software) and heterogeneous catalog (Kijko software).

In the Deterministic Seismic Hazard Assessment, Ahwaz and Behbahan city were selected as the target site. The results of this study showed that in the Ahwaz city, the Kuh-e-Zard fault will have the highest magnitude and the Ahwaz fault will be the most accelerated. For the city of Behbahan, the Kuh-e-Zard fault will have the highest magnitude and the Behbahan fault will be the most accelerated, and indicating the length of the fault and the distance from the site are the determinant factors in Deterministic Seismic Hazard Assessment.

In the Probabilistic Seismic Hazard Assessment, which is the most common method for Seismic Hazard Assessment and allows for the use of multiple events and the effects of all earthquakes affecting the site are considered, using different software can be estimated. The Seismic Hazard Assessment was performed in this report using Crisis software and Seismic Hazard Assessment maps were obtained for the recurrence interval of 50, 100, 475, 1000, and 2475 years. The results of Probabilistic Seismic Hazard Assessment show that the curve of probability of annual occurrence in terms of acceleration for all sources is exponentially decreasing and the period of the structure increases with the increase of the recurrence interval, which this values is different for the different sources. The map of the hazard curves and acceleration curves for the different recurrence interval show that the most expected acceleration for the recurrence interval is 2475 years, which indicates that with the increase of the recurrence interval, the expected acceleration is also increased.

REFERENCES

Loh, C.H., Jean, W.Y. , and Penzien, J. (1994). Uniform-hazard response spectra – an alternative approach. *Earthquake Engineering and Structural Dynamics*, 23(4), 433-445.



Mirzaei, N., Gao, M., and Chen, Y.T. (1999). Delineation of potential seismic sources for seismic zoning of Iran. *J. Seismol.*, 3, 17-30.

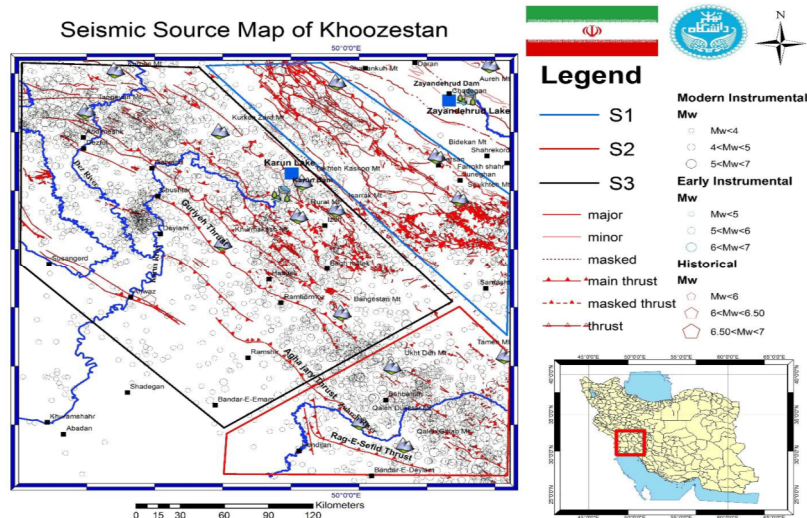


Figure 1. Seismic Source Map of Khuzestan.

Table 1. Result of Deterministic Seismic Hazard Assessment for Ahwaz City.

Number	Name	Distance (km)	Length (km)	M	r	PGA	Log PGA
1	Ahwaz	1.2	51.126	7.08	5.82	0.67	-0.17
2	Aghajari	56	132.31	7.58	50.7	0.1	-0.97
3	Marun	84.64	87.211	7.36	56.28	0.08	-1.06
4	Ramhormoz	62.38	111.54	7.49	84.83	0.05	-1.24
5	Guriyeh	86.24	74.719	7.28	62.63	0.07	-1.13
6	Lahbari	132.88	220.72	7.58	86.42	0.06	-1.17
7	Behbahan	159.31	135.89	7.6	159.41	0.02	-1.57
8	Kuh-e-Zard	21.45	211.45	7.79	211.52	0.01	-1.72
9	Dezful	91.27	66.84	7.22	91.44	0.04	-1.34
10	Tashan	171.39	20.971	6.61	171.48	0.01	-1.83

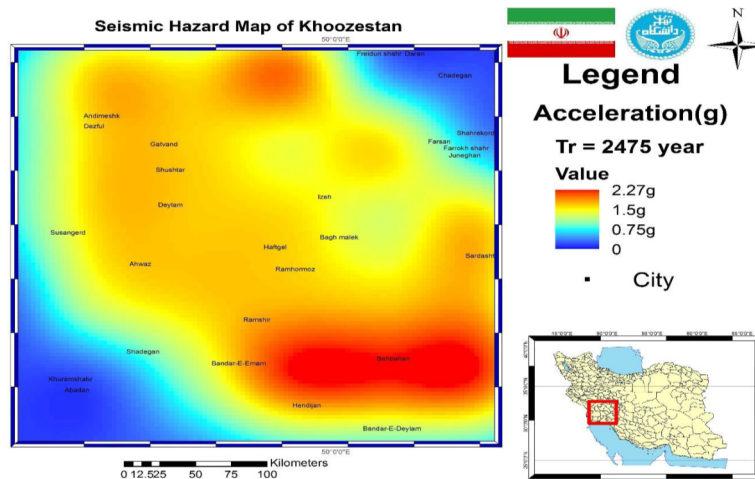


Figure 2. Map of Probabilistic Seismic Hazard Assessment for the recurrence interval of 2475 years.

