



SEISMIC HAZARD ASSESSMENT OF GORGAN, IRAN

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Abstract

Seismic hazard assessment has been done for Gorgan city in this article. Horizontal Peak Ground Acceleration values (PGA) for earthquakes with return periods of 475 and 2475 years have been calculated for this region by probabilistic approach of seismic hazard analysis. For this purpose, first, active faults and uniform catalogue of earthquakes in a radius of 150 km around Gorgan have been used. After that, seismicity parameters have been evaluated using the methods in which magnitude uncertainty and incompleteness of earthquake data are considered. By using three attenuation relationships, seismic hazard assessment has been carried out using the SEISRISKIII computer program. Two iso-acceleration maps have been prepared to provide a probabilistic estimate of horizontal Peak Ground Acceleration (PGA) over bedrock for two mentioned hazard levels. Finally, the results have been compared with the seismic macrozonation hazard map of Iran, Standard 2800.

Keywords: seismicity parameters, PGA, attenuation relationship, probabilistic approach, Gorgan.

1. INTRODUCTION

Iran is one of the most seismic countries of the world that have experienced a lot of financial and life losses due to earthquakes. Iran is located on Alpine-Himalayan seismic belt and has been threatened by catastrophic earthquakes every several years. Some of these destructive earthquakes that have occurred in 20th century are listed in table-1 [1]. Figure 1 shows recent seismicity of Iran [1].

With due attention to this fact that seismic potential varies widely from one region to another, seismic parameters assessing of Iran's different parts is one of the main interests of earthquake researchers. Some of the regions for which seismic hazard analysis has been conducted are Tehran [2] –the capital of Iran-, Shiraz [3], Arak [4] and Kermanshah-Sanandaj [5]. Gorgan -the center of Golestan Province- is situated in the east-north of Iran with high seismic activity in Iranian Code of Practice for Seismic Resistant Design of Buildings, standard 2800 (BHRC [6]). Table-2 shows some destructive earthquakes that have occurred in a circular area in a radius of 150 km with Gorgan as the zone center [7].

Occurrence of such destructive earthquakes indicates that Gorgan is exposed to high seismic hazards. On the other hand, because of geographical, social and economical situation of Gorgan as the center of the Golestan province, this city is densely populated. By considering all of these factors, this region is prone to high seismic financial and life losses. Therefore, seismic potential evaluation of different parts of the city is necessary. For this purpose, in this essay, horizontal Peak Ground Acceleration (PGA) values for earthquakes with return periods of 475 and 2475 years have been calculated in Gorgan region by probabilistic seismic hazard analysis.