SEISMIC HAZARD ANALYSIS FOR MIRABAD PUMPED-STORAGE PROJECT

S. SOLEYMANI[1], M.DALIRI [1], A.ADIB[2], H.BAHRAMI[2]

1- Expert of Dam Constructing Group, Toossab Consulting Engineers Co., Iran

2- Expert of Technical Office in Khorasan Razavi R.W.O, Iran Ministry of Power

Soleymani29@gmail.com

Abstract

The Mirabad pumped-storage project, now under feasibility study stage and predicted as a lower CFR dam and a upper cut & cover dam, is located in a region of high seismicity. A seismic hazard analysis was performed to determine the design ground motion parameters for the project The ground motion parameters for the MDL, DBL and CL were obtained from a PSHA whereas the MCL ground motion was derived from a DSHA. Among the many faults occurring within the area considered for the analysis, there are four major faults (i.e. Binalud, Neyshabur, North Neyshabur and Fariman), all with a seismic potential of M≥6.9 and a rupture length exceeding 0.5 km, regarded as the most critical ones for the Mirabad dam site. The Binalud fault, a WNW-ESE-striking thrust fault is the one closest to the project site with a distance to the seismogenic rupture surface of only 0.5 km. With this fault the medians (50th percentile) of the PGA for the MCL are respectively: 0.72g and 0.57g for the Lower Dam site.

Keywords: Seismic hazard analysis, Fault, Seismo-tectonics, Design ground motion, Iran.

1. INTRODUCTION

The Mirabad dam project, located about 20 km north of Neyshabur and east of Bar river (see Figure 1), predicted as a concrete face rockfill dam (CFRD) of 50 m and a upper cut & cover dam of 40 m height [1]. This project falls within a region of high seismicity, the Koppeh-Dagh seismo-tectonic province. In order to estimate the ground motion parameters a comprehensive seismic hazard analysis was performed. This paper gives first a brief overview of the seismo-tectonics of the region and the seismicity. The methodology followed to obtain the peak ground acceleration and design accelerograms for different design levels is then described together with selected results.

2. SEISMOTECTONIC SETTING AND HISTORICAL SEISMICITY

The Koppeh-Dagh region is characterized by thick layers with Max thickness 10 km. The data necessary for the seismic hazard analysis were obtained from a survey of the type, location and characteristics of seismic sources, especially faults. Information obtained from earthquake catalogues gave input on the historical seismicity of the region. The catalogues were also used as a basis for probabilistic analyses of earthquake ground motions. The area surveyed for assessing the seismicity comprised a circle with a radius of about 100 km from the dam sites. Epicenters in this region are shown in Figure 2.