Seismic Hazard Assessment of Koragh-Paraith Hydropower Project at Mastuj River, District Chitral, KPK, Pakistan

Shahbaz Muhammad[1*], and Farrukh Rahim Shahzed[2]

[1]*Geological Survey of Pakistan, Lahore;*

[2]*Geological Survey of Pakistan, Quetta*

[*]*Email: geoshahbazmj@gmail.com*

The Koragh-Paraith Hydropower project with a design capacity of 223 Mega Watt is proposed at Mastuj River in Chitral district, KPK, Pakistan. The project area lies in a historically active region of Eurasian plate close to Main Karakoram Thrust (MKT) and surrounded by gigantic Hindukush Mountain ranges. An active fault system is surrounding the project area which is confirmed by the historical and instrumental earthquake data collected for the present study. In the present study, deterministic seismic hazard assessment (DSHA) and probabilistic seismic hazard assessment (PSHA) for Koragh-Paraith Hydropower project is performed. In DSHA, maximum moment magnitude (Mw) and peak ground acceleration (PGA) values for several tectonic features (MKT, Reshun Fault, Trich Mir Fault and Hindukush Seismic Zone) affecting the project site are evaluated. The MKT and Reshun Fault are thrust faults while Trich Mir Fault is sinistral in nature. For tectonic features of the study area i.e., MKT, Reshun Fault, Trich Mir Fault and Hindukush seismic zone, the Mw is evaluated as 7.6, 7.5, 7.5 and 8.0 respectively by using the attenuation equation of Wells & Copersmith (1994). Similarly, the PGA values for these tectonic features are evaluated as 0.28g, 0.58g, 0.49g and 0.19g respectively. Moreover, in the procedure of PSHA, the seismic design parameters in accordance with the International Committee of Large Dams (ICOLD) guidelines are evaluated. For PSHA, the selected seismic source zones are Hindukush, Pamir, Kohistan and Himalayas. The PGA for Operating Based Earthquake (OBE), Design Based Earthquake (DBE), Safety Evaluation Earthquake (SEE) and Maximum Credible Earthquake (MCE) are determined as 0.20g, 0.29g, 0.33g and 0.60g to be used for the seismic resistant design of dam and its appurtenant structures.