საერთაშორისო სამეცნიერო კონფერენცია „დედამიწასა და მის გარსებში მიმდინარე გეოფიზიკური პროცესები“
შრომები, ISBN 978-9941-36-147-0, თბილისი, საქართველო, 16-17 ნოემბერი, 2023 წ.
International Scientific Conference "Geophysical Processes in the Earth and its Envelopes"
Proceedings, ISBN 978-9941-36-147-0, Tbilisi, Georgia, November 16-17, 2023

SITE CHARACTERIZATION FOR CRITICAL INFRASTRUCTURE

Shubladze T., Tsereteli N., Tugushi N.

Mikheil Nodia Institute of Geophysics of Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia
nino_tsereteli@tsu.ge

Abstract: *Using the H/V spectral ratio method, various regions of Georgia were studied and the dominant frequencies characterizing each region were assessed.*

Key words: *seismic hazard, seismograph, H/V spectral ratio method.*

Georgia, like the whole South Caucasus, is a tectonically and structurally complex region. It is one of the most active segments of the Alpine-Himalayan belt, therefore it is important to assess the seismic hazard for Georgia. At the regional scale, this assessment is evaluated by applying probabilistic seismic hazard analysis that identifies the annual probability of exceedance of various ground – motion levels defined in terms of selected ground motion intensity measures, such as PGA or accelerations corresponding to various return periods related to pissible future earthquake scenarios for a site represented by soil classes A according to EC8, Eurocode 8-EN 1998-1 (1998).

At the local scale, seismic hazard assessment is made by analyzing the geological, geomorphological, geotechnical and geophysical charasteristics of the site, as it is well established that the incoming seismic motion can change in amplitude, frequency, and duration due the site-specific local charasteristics. That is the subject of microzonation investigation. Site – specific local charasteristics are presented by the following parameters: Dominant frequency, Vs,30 (averaged shear-wave velocity to a depth of 30 meters) and amplification factor. In this work, we presented results of geophysical surve assessing local seismic conditions by dominant frequency and Vs,30 for designing and construction of seismically resistant critical infrastructure like hydro power plant in west Georgia and high-riseebuilding in Tbilisi. For this purpose, seismic records have been used first time in Georgia.

To study the dynamic characteristics of the ground soil, we used the TROMINO 3G seymograph, TROMINO 3G is a small, ultralight, 6-channel seismograph, which consists of a seismic receiver (sensor) and a digital converter of an analog signal (with the possibility of further data accumulation or transmission). Among the empirical methods, the H/V spectral ratio of ambient noise/vibrations is one of the most common approaches in the world, although it was used for the first time in Georgia by us, With this method, we investigated different regions of Georgia, and evaluated what kind of dominant frequencies each area was characterized by. The conducted studies have shown us that the mountainous region of Georgia is mainly characterized by high resonance frequencies, which emphasizes that the underlying soils are close to the surface, although medium frequencies are also observed on their terraced part.