



Estimating the geotechnical Parameters from CSEM monitoring Data for the Buildings and the Environment at the City of 15th May, Egypt

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The site of investigation, 15th May city, is a new suburb of Helwan, at about 35 km south of Cairo, Egypt. The work is aimed to investigate the rock mass stability at "Quarter 27" in 15th May City, which is linked with cracks formation into the buildings. A controlled source electromagnetic (CSEM) approach developed earlier by IGF UB RAS (Geophysical Federal Institute, Ural Branch of Russian Academy of Science) is applied to image the ranked deformation levels in the massive structure. The wide profile system of observation has been used to monitor the three components of the alternating magnetic field along predefined measuring lines in the study area. Four cycles of observation have been carried out in 2008, 2010, 2011, and 2012. The acquired data sets have been subjected to analytical processing procedure to estimate the changes in the geotechnical parameters during the time of these four cycles of observation. The analytical treatments provided good information about the structure of the rock massive and its rank of degradation, the lateral distribution of the geotechnical heterogeneity, and finally a conclusive outcome about foundation stability. We conclude that the general dynamic state close to the destruction level within the investigation area is getting worse over the time; this is reflected in the crack's densities and positions, also on the changes in the lateral distribution of geoelectric heterogeneity as an indicator of the saturation of the surface rock in the study area with water [1].

Reference

1. Magdy A. Atya, Olga A. Hachay, Mamdouh M. Soliman, Oleg Y. Khachay, Ahmed B. Khalill, Mahmoud Gaballah, Fathy F. Shaaban and Ibrahim A. El. Hemali. CSEM imaging of the near surface dynamics and its impact for foundation stability at quarter 27, 15-th of May City, Helwan, Egypt. // Earth sciences research journal, 2010, Vol. 14, N1, p. 76-87.