

Application of the Shallow Seismic Refraction Technique to Characterize the Foundation Rocks at the Proposed Tushka New City Site, South Egypt

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Abstract : Tushka New City is one of the proposed new cities in South Egypt. It is located in the eastern part of the western Desert of Egypt between latitude 22.878° and 22.909° N and longitude 31.525° and 31.635° E, about 60 kilometers far from Abu Simble City. The main target of the present study is the investigation of the shallow subsurface structure conditions and the dynamic characteristics of subsurface rocks using the shallow seismic refraction technique. Forty seismic profiles were conducted to calculate the P- and S-waves velocity at the study area. P- and SH-waves velocities can be used to obtain the geotechnical parameters and also SH-wave can be used to study the vibration characteristics of the near surface layers, which are important for earthquakes resistant structure design. The output results of the current study indicated that the P-waves velocity ranged from 450 to 1800 m/sec and from 1550 to 3000 m/sec for the surface and bedrock layer respectively. The SH-waves velocity ranged from 300 to 1100 m/sec and from 1000 to 1800 m/sec for the surface and bedrock layer respectively. The thickness of the surface layer and the depth to the bedrock layer were determined along each profile. The bulk density ρ of soil layers that used in this study was calculated for all layers at each profile in the study area. In conclusion, the area is mainly composed of compacted sandstone with high wave velocities, which is considered as a good foundation rock. The south western part of the study area has minimum values of the computed P- and SH-waves velocities, minimum values of the bulk density and the maximum value of the mean thickness of the surface layer.

Keywords : seismic refraction, Tushak new city, P-waves, SH-waves

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