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Application of Seismic Refraction Method in Geotechnical Study

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Abstract : The study area lies in Al-Falah area on Airport-Tripoli in Zone (16) Where planned establishment of complex multi-floors for residential and commercial, this part was divided into seven subzone. In each sup zone, were collected Orthogonal profiles by using Seismic refraction method. The overall aim with this project is to investigate the applicability of Seismic refraction method is a commonly used traditional geophysical technique to determine depth-to-bedrock, competence of bedrock, depth to the water table, or depth to other seismic velocity boundaries The purpose of the work is to make engineers and decision makers recognize the importance of planning and execution of a pre-investigation program including geophysics and in particular seismic refraction method. The overall aim with this thesis is achieved by evaluation of seismic refraction method in different scales, determine the depth and velocity of the base layer (bed-rock). Calculate the elastic property in each layer in the region by using the Seismic refraction method. The orthogonal profiles was carried out in every subzones of (zone 16). The layout of the seismic refraction set up is schematically, the geophones are placed on the linear imaginary line whit a 5 m spacing, the three shot points (in beginning of layout–mid and end of layout) was used, in order to generate the P and S waves. The 1st and last shot point is placed about 5 meters from the geophones and the middle shot point is put in between 12th to 13th geophone, from time-distance curve the P and S waves was calculated and the thickness was estimated up to three-layers. As we know any change in values of physical properties of medium (shear modulus, bulk modulus, density) leads to change waves velocity which passing through medium where any change in properties of rocks cause change in velocity of waves. because the change in properties of rocks cause change in parameters of medium density (ρ), bulk modulus (κ), shear modulus (μ). Therefore, the velocity of waves which travel in rocks have close relationship with these parameters. Therefore we can estimate theses parameters by knowing primary and secondary velocity (p-wave, s-wave).

Keywords : application of seismic, geotechnical study, physical properties, seismic refraction
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