

## Subsurface Elastic Properties Determination for Site Characterization Using Seismic Refraction Tomography at the Pwalugu Dam Area

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**Abstract :** Field measurement of subsurface seismic p-wave velocities was undertaken through seismic refraction tomography. The aim of this work is to obtain a model of the shallow subsurface material elastic properties relevant for geotechnical site characterization. The survey area is at Pwalugu in Northern Ghana, where a multipurpose dam, for electricity generation, irrigation, and potable water delivery, is being planned. A 24-channel seismograph and 24, 10 Hz electromagnetic geophones, deployed 5 m apart constituted the acquisition hardware. Eleven (2-D) seismic refraction profiles, nine of which ran almost perpendicular and two parallel to the White Volta at Pwalugu, were acquired. The refraction tomograms of the thirteen profiles revealed a subsurface model consisting of one minor and one major acoustic impedance boundaries - the top dry/loose sand and the variably weathered sandstone contact, and the overburden-sandstones bedrock contact respectively. The p-wave velocities and by inference, with a priori values of poisson ratios, the s-wave velocities, assisted in characterizing the geotechnical conditions of the proposed site and also in evaluating the dynamic properties such as the maximum shear modulus, the bulk modulus, and the Young modulus.

**Keywords :** tomography, characterization, consolidated, Pwalugu and seismograph

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