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SUBSURFACE INVESTIGATIONS AT CHIPARA DAM SITE

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Abstract

This study applies the seismic refraction method to find the depth to bedrock at a proposed dam site at Chipara in Mashonaland East province, Zimbabwe. Data was collected from ten profiles at the site, two of them, thus profiles A and B being potential sites on which the dam wall can be erected (centerline options). The sensors used were geophones with the Terralock seismograph system for data collection. Travel time curves were plotted and were then used to determine layer and bedrock velocities for each of the four sections per spread for the eighteen spreads spanning the entire site. The Hawkins approach is used for determining the layer and bedrock depth beneath each geophone in order to get the depth profiles. Layer velocity is found by calculating the direct and reversed apparent velocities, bedrock velocity is calculated using the reciprocal method. Velocity distribution is then inferred and superimposed onto the profiles. Since layer velocity is a good indicator of hardness, sections with hard rocks are identified as regions with higner velocity values (7 600m/s). The two centreline options are compared to come up with the better option on the basis of volume and hardness of material to be excavated.

Key words: Seismic refraction, bedrock, subsurface structure, spread, velocity distribution, depth profile centreline.