

3D Effect Study of Direct Current Resistivity Data from Embankment Dam Investigation

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Abstract

The embankment dam assessment can be done by using two-dimensional direct current resistivity (DCR) technique. Normally we do 2D survey, but dam's structure is actuality in three-dimension. The observed data along the crest of the embankment dam are distorted by the 3D effect such as the embankment geometry, curvature and difference of electrical resistance of the embankment components. In this project, we study the distortion from curvature and difference of electrical resistance of the embankment components. We compare the forward modeling results between the 2D and 3D models that digitized from the dam layout of the Lam Phra Phloeng Dam, Pak Thong Chai district, Nakhon Ratchasima province. The results show that the dam's curvature can reduce the apparent resistivity about 9% beneath the curve. Next study, the electrical resistivity of core zone was fixed as 20 Ohm.m and varies the random zone as 20, 40 and 100 Ohm.m, to calculate the 2D and 3D response. Then we calculate the degree of distortion (DDAR) by using the equation from the study of Nguyen and Pham (2017). The degree of distortion of the electrical resistance in each case was 31%, 62% and 116%, respectively.

Keywords: 3D effect, curvature, geometry, degree of distortion percent