

**Electrical Resistivity and Seismic Refraction Tomography for Subsurface Cavity
Detection: A Case Study at Huai Pong Reservoir Project, Lampang**

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Abstract

The Huai Pong Reservoir Project, located in Ban Lang subdistrict, Mueang Lampang district, Lampang province, has been proposed to solve the problem of water shortage for agriculture during the dry season. Cavities in the upper part of the limestone basement were found in boreholes along the center of the proposed dam construction site. In this study, 2-D electrical resistivity tomography (ERT) and seismic refraction tomography (SRT) were applied to delineate the positions of the cavities and their connectivity beneath the proposed dam site for reservoir design and construction planning. The 2-D ERT and SRT data were collected along the same 200m length survey line across the borehole locations. The integrated interpretation of inverted ERT and SRT results, along with geological borehole data, reveals three subsurface layers: the topmost layer is composed of topsoil and unconsolidated sediments; the middle layer is composed of weathered limestone and sandstone; and the lowermost layer is composed of massive limestone. Four positions of cavities are found along the survey line, and two of them are possibly connected. The presence of cavities is an indicator of the poor subsurface condition of the dam construction site. However, this information can be used to support the engineers in deciding on the construction or the dam design at the Huai Pong Reservoir Project.

Keywords: electrical resistivity tomography, seismic refraction tomography, subsurface cavity detection