

A CASE STUDY OF AN INVESTIGATION INTO THE CAUSE OF CANAL SIDE ROAD FAILURE ALONG AN IRRIGATION CANAL

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1. ABSTRACT

The failure of a road along a canal is called canal-side road failure, which has occurred annually, especially in the area where is located on soft ground. Due to the drought, the water level rapidly decreased, which is directly affecting to the canal-side road failure. Therefore, the rapid drawdown condition is an important consideration in the design of canal slopes [1-2].

The utilization of a geophysical survey, which is a resistivity survey, can be used to identify the subsoil layer based on the concept of moisture content of the soil in the investigation area with a wide area and undisturbed conditions [3]. On the other hand, many civil engineers lack the knowledge and experience to understand the resistivity-survey results. Due to the limitation of the geophysical surveys, screw driving sounding (SDS) test, which was developed in Japan, was proposed to investigate the soil parameters at the site investigation such as layer thickness and soil strength.

The study aimed to evaluate a canal-side road failure in a soft ground area, which was achieved by combining the results of site investigation data from a resistivity survey combined with undrained shear strength parameter from SDS test. Moreover, the effectiveness of the combining site investigation was confirmed by using the 2-dimensional (2-D) finite element software because it can simulate the soil behavior in the site investigation, which were similar detail and assumption, which were closely related to soil behavior in the site investigation.

Consequently, it was confirmed that the results from the resistivity survey can be used to identify the weak zones of failure location, while the results from the SDS test can be used to estimate the shear strength parameter and evaluated the soil layer thickness. The results of the stability of the canal side road in the failure zone and stability zone under low- and high-water levels conditions from 2-D FEM software can be used to confirm that soil layer thickness from the resistivity survey was successfully mapped with the shear strength parameter from the SDS test.

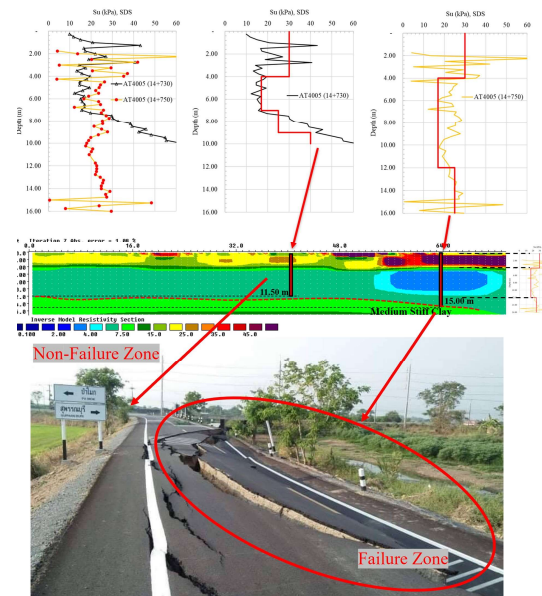


Figure 1. Relationship between resistivity survey and SDS results at non-failure and failure zones

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