

Preliminary evaluation of ground collapse from sandy soil with varying volumetric water content in a soil chamber

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Recently, interest has arisen in the study of the stability of soil during ground excavation, by predicting changes in groundwater level using the GPR and TDR exploration. In this study, the changes in volumetric water content within the soil in the vertical direction were measured continuously by the TDR exploration, and the change in the horizontal direction was measured by the GPR. The result of this experiment can be used as a basis for analysing the major contributing factors of ground relaxation and the formation of cavities. Some soil index properties were obtained from some field tests that include: particle size distribution, unit weight, and water content. In order to reproduce the groundwater seepage in the soil chamber, a porous mat was installed below the chamber to control the groundwater level. The variation of volumetric water content in the sand layer was obtained by conducting the TDR test which can measure the permittivity of the sandy soil layer. In addition, the GPR exploration was conducted to determine the dielectric constant response to soil within the large area of the soil chamber. The result of this study can be used to predict the potentials of ground collapse, by monitoring the θ -t curve. The curve can be obtained from the GPR measurements of changes in volumetric water content (θ_0 , θ_r , θ_s) and the TDR measurements of change in groundwater level in the soil chamber.

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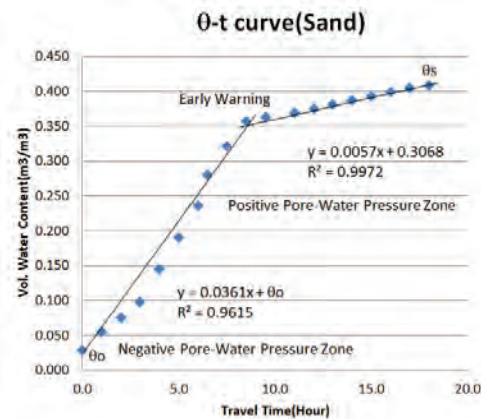


Figure: soil chamber test (top), θ -t curve measured by soil chamber test (bottom).

REFERENCES

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