Thesis Title	The Study of Soil-Layer Prediction using Neural Networks
Thesis Credits	12
Candidate	Mr. Sittisak Imsombat
Supervisor	Dr. Pasit Lorterapong
Degree of Study	Master of Engineering
Department	Civil Engineering
Academic Year	1998

Abstract

The variation in soil layer has been regarded as one of the problems frequently encountered in foundation engineering discipline. Existing soil data, if available, can normally be used as information for the design of foundation of a new facility. This is particularly true for the project that occupies a large construction area where a number of bore hole is limited due to economic reasons. A tool that utilizes the data obtained from soil investigations, and capable of predicting soil layers or properties at other locations within the project area may prove useful for soil engineering practice.

The present study investigates the possibility of using Artificial Neural Networks (ANN) for soil layer prediction. ANN simulates the operations of a human-brain, making use of experience in solving the problem at-hand. Back propagation technique was used to develop a suitable weight matrix. A computer program called "NeuroSOIL" has been developed for the prediction of four soil parameters including Shear strength, Unit weights, Standard penetration test, and Soil type. Soil data obtained from 10 construction sites were used to train the neural network model. Each site contains data of at least five boreholes. The trained modules were then used to predict the four soil parameters at locations where relevant data was not used in the training process. The prediction results obtained from NeuroSOIL were found to be in-line with existing data with a 95 percent level of confidence. It is also found that level of accuracy for the predictions depends mainly on the design of ANN architecture, the default value of Learning rate, Momentum, Number of iteration, and level of threshold.

Keywords: Artificial Neural Network / Back Propagation / Soil Layer Prediction / Human Brain