Forecasting the Compressibility Parameters of Gypseous Soil using Artificial Neural Networks

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To ensure safe design of structures against settlement, it is necessary to determine the compressibility parameters of the underneath soil especially compression and rebound indices. In this paper, an approach to forecast the compressibility parameters of gypseous soils based on index parameters was developed using Artificial Neural Networks technique. Two equations were developed to estimate compression and rebound indices using back propagation algorithm to train multi-layer perceptron, in which good agreements were achieved. The input parameters used were: the depth, gypsum content, liquid limit, plastic limit, plasticity index, passing sieve No.200, dry unit weight, water content and initial void ratio. Two output parameters were determined including compression index and rebound index. A parametric study was also conducted to investigate the generalization and robustness of both models. The findings indicate that both models were reliable within the range of utilized data. It was found that gypsum content has the highest effect on the compressibility index followed by water content, plasticity index, dry unit weight and plastic limit, while other parameters have lower effect. The gypsum content has the highest effect again on the rebound index followed by passing sieve No.200, initial void ratio, plastic limit and plasticity index, while other parameters have lower effect