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Mathematical Model to Predict Swelling of Expansive Soil

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ABSTRACT: In this paper, a simple mathematical model is proposed to predict the swelling behavior of an expansive soil from Saudi Arabia. The model consists of one equation with many parameters. The main advantage of this model is that only one parameter is needed to run the model. While the other model parameters can be determined using the best fitting curve technique. The testing program includes oedometer swell tests that were carried out at different levels of applied pressure with different values of the initial water content of the tested samples. The unknown parameter is the applied pressure which is needed to run the model. The other parameters of the model including the initial slope of the swell-time curve, the final slope, the reference swell and the peak swell were investigated experimentally. Based on the experimental results, empirical relationships were developed for determination of these parameters as functions of the applied pressure. The model prediction were compared with the experimental results and showed good agreements for all levels of applied pressure and the different values of the initial water content of the tested soil.