عنوان مقاله:

A New Model of Equivalent Modulus Derived from Repeated Load CBR Test

نویسندگان:

A. Salmi - *Structural and Material Mechanics team, National High School of Electricity and Mechanics, Hassan II University of Casablanca, Casablanca, Morocco*

L. Bousshine - *Structural and Material Mechanics team, National High School of Electricity and Mechanics, Hassan II University of Casablanca, Casablanca, Morocco*

K. Lahlou - *Research Team in Construction Engineering, LaGCHEC Laboratory, Hassania School of Public Works, Casablanca, Morocco*

خلاصه مقاله:

This paper presents a new model of equivalent modulus derived from the Repeated Load CBR (RL-CBR) test without strain gauge. This model is an updated version of Araya et al. model (2011), the update consists of using the vertical strain as weighting factor instead of vertical displacement in the mean vertical and horizontal stresses calculation. The accuracy of equivalent modulus was improved by decreasing the relative error from 25% to 3%. The extra-large mold adopted by Araya et al. is used with a thickness of 8 mm instead of 14.5 mm. In experimental investigations, equivalent modulus may be calculated from experimental data and model parameters estimated by finite element (EF) simulation. There are five model parameters when the RL-CBR test is used, and three parameters when the strain gauge is not used. Model parameters are determined in two steps. First, the FE simulation of the RL-CBR test is conducted using various loading conditions (i.e., plunger penetration) and various quality ranges of unbound granular materials (UGM). In the second step, the non-linear multidimensional regression is accomplished to fit the equivalent modulus to Young's modulus. The influence of FE analysis inputs is investigated to find the optimal inputs set that make the best compromise between the model accuracy and the calculation time consumption. The calculation of model parameters is carried out based on the optimal set data. Results from the new model and those from Araya et al. model are compared and have shown the improved accuracy of the developed model.

کلمات کلیدی:

Modulus CBR Granular Material Least, squares Method Stiffness Strain Gauge Resilient Behavior

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