PREDICTING THE CALIFORNIA BEARING RATIO OF CEMENT-TREATED LATERITES SOIL STABILIZED WITH RICE HUSK ASH USING ARTIFICIAL NEURAL NETWORK MODELS

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Abstract

With increase in human population, waste generation has also increased. Effective disposal of these wastes has been a problem, it is in this light that economic use of these waste such as rice husk has been in the fore-burner. Combustion of rice husk produces rice husk ash (RHA), a pozollanic material, which can be effectively used in partial replacement of the expensive cement in soil stabilization. Also, since carrying out of fundamental tests such as California bearing ratio (CBR) in road construction is time consuming, thus, resulting to reduced efficiency, developing of credible models such as the Artificial neural network (ANN) becomes imperative. In going about this, the soil sample was subjected to preliminary tests, such as; particle size distribution, atterbergs limits and specific gravity tests for purpose of classification. Thereafter, cement at varying proportions of 0-12% at 2% intervals was mixed with RHA in proportions of 0-16% at 2% intervals. The mixes at each stage was subjected to compaction, atterberg limits and CBR tests. The laboratory results served as inputs in developing the ANN model, which predicted both soaked and the unsoaked CBR results. The feed forward neural network with Levenberg-Marquardt back propagation ANN model of MATLAB training was employed to determine the best model. It can therefore be concluded that the ANN models developed can adequately predict the CBR values of cement-treated A-7-5 soil stabilized Rice husk ash (RHA).

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