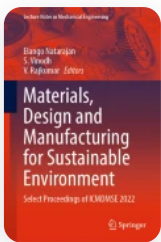


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Prediction of Strength and Durability Characteristics of Rice Husk Ash Concrete Using Artificial Neural Network (ANN)

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Abstract

Rice husk ash (RHA) is an agro-based waste used as a sustainable supplement in concrete. The RHA produced by controlled incineration completely blends in

concrete mix by increasing the pozzolanic property since it holds silica without compromising on cement properties. After replacing RHA partially in cement, a fair refinement in porous structure increases strength and durability characteristics. The present paper investigates the application of statistical models to predict the characteristics using MATLAB software by ANN tool with networks like FFNN, LRNN, CFNN and ENN. The network performance characteristics such as RMSE, MAE, MRE, prediction accuracy percentage and computational time are used to find the optimal network. The dependent variables are 28th day compressive strength, ultrasonic pulse velocity test results and water absorption percentage. Two hundred and eleven mix design samples of RHA concrete were collected from the various reputed journals published within a decade. Water to binder ratio, cement, RHA, water, fine, coarse aggregate and super plasticizer were used as input parameters to develop the models and ultimately to predict strength and durability characteristics of RHA concrete. The comparison results of the various prediction showed that all the four networks performed roughly same, but based on overall performance characteristics, the developed CFNN model is identified as the optimal ANN, used for predictions in the future.

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