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MODELING OF COMPRESSIVE STRENGTH OF HIGH PERFORMANCE CONCRETE USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT

An Artificial brain-like network, based on certain mathematical algorithms developed using a numerical computing environments like MATLAB is called as 'Artificial Neural Network' (ANN). High-performance concrete is a highly complex material, which makes modeling its behavior, a very difficult task. In this present paper, ANN predicting the compressive strength cubes for binary and ternary combination mixes of high performance concrete are developed at the age of 28, 56, 90 and 180 days of curing. For building these models, training and testing using the available experimental results, for 60 specimens produced with 5 different mixture proportions are used. The data used in the multi-layer feed forward neural network models are designed, in a format of eight input parameters covering the age of the specimen, cement, silica fume (SF), fine aggregate (FA), bottom ash (BA), coarse aggregate (CA), steel slag aggregate (SSA) and water. According to these input parameters, in the multi-layer feed forward neural network models are used, to predict the compressive strength values of concrete. It is shown that, neural networks had high potential for predicting the compressive strength results of the high performance concrete, incorporating with silica fume, bottom ash and steel slag aggregate.

KEYWORDS: Silica Fume, Bottom Ash, Steel Slag Aggregate, High Performance Concrete, Artificial Neural Network