

Mix Proportioning and Strength Prediction of High Performance Concrete Including Waste Using Artificial Neural Network

Authors : D. G. Badagha, C. D. Modhera, S. A. Vasanwala

Abstract : There is a great challenge for civil engineering field to contribute in environment prevention by finding out alternatives of cement and natural aggregates. There is a problem of global warming due to cement utilization in concrete, so it is necessary to give sustainable solution to produce concrete containing waste. It is very difficult to produce designated grade of concrete containing different ingredient and water cement ratio including waste to achieve desired fresh and harden properties of concrete as per requirement and specifications. To achieve the desired grade of concrete, a number of trials have to be taken, and then after evaluating the different parameters at long time performance, the concrete can be finalized to use for different purposes. This research work is carried out to solve the problem of time, cost and serviceability in the field of construction. In this research work, artificial neural network introduced to fix proportion of concrete ingredient with 50% waste replacement for M20, M25, M30, M35, M40, M45, M50, M55 and M60 grades of concrete. By using the neural network, mix design of high performance concrete was finalized, and the main basic mechanical properties were predicted at 3 days, 7 days and 28 days. The predicted strength was compared with the actual experimental mix design and concrete cube strength after 3 days, 7 days and 28 days. This experimentally and neural network based mix design can be used practically in field to give cost effective, time saving, feasible and sustainable high performance concrete for different types of structures.

Keywords : artificial neural network, high performance concrete, rebound hammer, strength prediction

Conference Title : ICANNCE 2018 : International Conference on Artificial Neural Networks in Civil Engineering

Conference Location : Mumbai, India

Conference Dates : February 22-23, 2018