Modeling slump of ready mix concrete using artificial neural network

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Abstrak

With rapid growth in the construction industry, Ready Mix Concrete (RMC) is playing a key role in offering customized quality of concrete to contractors and builders. The workability of concrete covers early age operations of concrete viz., placing, compaction and finishing. Since RMC is manufactured at a plant and transported to the construction site, hence the loss of workability is of prime concern due to the considerable time interval between mixing and placing of concrete. Workability of concrete measured using a slump test is an indicator to evaluate the life of RMC during its transportation phase and uniformity of concrete from batch to batch. The concrete mix proportions like cement, fly ash, coarse aggregates, fine aggregates, water and admixtures govern the workability or slump value of the concrete. Artificial Neural Networks (ANNs) learning from past examples gathered from RMC plant has been used to model the functional relationship between the input parameters and the slump value. The ANN model provided promising results compared to first order and second order regression techniques in modeling unknown and complex nature of relationships exhibited by the input parameters and the slump of concrete. The neural network synaptic weights which control the learning mechanism of ANN have been further used to compute the percentage relative importance of each constituent of RMC on the slump value.