Prediction of Compressive Strength Using Artificial Neural Network

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Abstract : Structures are a combination of various load carrying members which transfer the loads to the foundation from the superstructure safely. At the design stage, the loading of the structure is defined and appropriate material choices are made based upon their properties, mainly related to strength. The strength of materials kept on reducing with time because of many factors like environmental exposure and deformation caused by unpredictable external loads. Hence, to predict the strength of materials used in structures, various techniques are used. Among these techniques, Non-Destructive Techniques (NDT) are the one that can be used to predict the strength without damaging the structure. In the present study, the compressive strength of concrete has been predicted using Artificial Neural Network (ANN). The predicted strength was compared with the experimentally obtained actual compressive strength of concrete and equations were developed for different models. A good co-relation has been obtained between the predicted strength by these models and experimental values. Further, the co-relation has been developed using two NDT techniques for prediction of strength by regression analysis. It was found that the percentage error has been reduced between the predicted strength by using combined techniques in place of single techniques.

Keywords : rebound, ultra-sonic pulse, penetration, ANN, NDT, regression

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