以實驗計劃法與類神經網路建構混凝土的坍流度模型

葉怡成, 陳家偉

資訊管理學系

資訊學院

icyeh@chu.edu.tw

摘要

The significance of workability in concrete technology is obvious. The current empirical diagrams and tables presented in codes and standards for estimating workability are based on tests of concrete without supplementary cementitious materials (fly ash, blast furnace slag, etc.). The validity of these relations for concrete with supplementary cementitious materials should be investigated. Because of the high complexity of these relations, conventional regression analysis is not sufficient to build an accurate model. The artificial neural network (ANN) is a powerful tool for modeling complex nonlinear models. Therefore, in this study, a slump flow model has been built using design of experiments (DOE) and ANN. In this model, the slump flow is a function of the content of all concrete ingredients, including cement, fly ash, blast furnace slag, water, superplasticizer, coarse aggregate, and fine aggregate. This study led to the following conclusions: (1) Discovering doubtful experimental data produced by using the prototype model and repeating these experiments is very significantly beneficial for building a reliable model. (2) ANN can build a more accurate slump flow model than a 2-order polynomial regression can.

關鍵字：concrete, slump, design of experiment, modeling, artificial neural networks.