

Modeling slump of concrete with fly ash and superplasticizer

葉怡成

Information Management

Computer Science and Informatics

icyeh@chu.edu.tw

Abstract

The effects of fly ash and superplasticizer (SP) on workability of concrete are quite difficult to predict because they are dependent on other concrete ingredients. Because of high complexity of the relations between workability and concrete compositions, conventional regression analysis could be not sufficient to build an accurate model. In this study, a workability model has been built using artificial neural networks (ANN). In this model, the workability is a function of the content of all concrete ingredients, including cement, fly ash, blast furnace slag, water, superplasticizer, coarse aggregate, and fine aggregate. The effects of water/binder ratio (w/b), fly ash-binder ratio (fa/b), superplasticizer-binder ratio (SP/b), and water content on slump were explored by the trained ANN. This study led to the following conclusions: (1) ANN can build a more accurate workability model than polynomial regression. (2) Although the water content and SP/b were kept constant, a change in w/b and fa/b had a distinct effect on the workability properties. (3) An increasing content of fly ash decreased the workability, while raised the slump upper limit that can be obtained.

Keyword: fly ash, superplasticizer, workability, artificial neural networks.