A Approach of Mix Design Method for HPC by Fuller’s Ideal Curve

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Abstract

This study is mainly aimed at to apply Fuller’s ideal gradation curve to the design of high performance concrete (HPC) with the aid of error function $R^2 = \sum_{j=1}^{m} \left( \sum_{i=1}^{n} P_{ij}a_{ij} - k_j \right)^2$. The result shows the mixture proportion of solid particles designed by Fuller’s curve reaches the maximum density higher than conventional mixture design methods including the densified mixture design algorithm (DMDA). This approach provides a basic numerical analysis model for designing SCC with less water and cement content. Furthermore, this approach can be applied to other concrete material containing nano size particle such as reactive power concrete (RPC).

Keyword: Fuller’s ideal gradation curve, self-compacting concrete (SCC), error function, maximum density, densified mixture design algorithm (DMDA), reactive power concrete (RPC)