

Fractal Nature of Granular Mixtures of Different Concretes Formulated with Different Methods of Formulation

Authors : Fatima Achouri, Kaddour Chouicha, Abdelwahab Khatir

Abstract : It is clear that concrete of quality must be made with selected materials chosen in optimum proportions that remain after implementation, a minimum of voids in the material produced. The different methods of formulations what we use, are based for the most part on a granular curve which describes an 'optimal granularity'. Many authors have engaged in fundamental research on granular arrangements. A comparison of mathematical models reproducing these granular arrangements with experimental measurements of compactness have to verify that the minimum porosity P according to the following extent granular exactly a power law. So the best compactness in the finite medium are obtained with power laws, such as Furnas, Fuller or Talbot, each preferring a particular setting between 0.20 and 0.50. These considerations converge on the assumption that the optimal granularity Caquot approximates by a power law. By analogy, it can then be analyzed as a granular structure of fractal-type since the properties that characterize the internal similarity fractal objects are reflected also by a power law. Optimized mixtures may be described as a series of installments falling granular stuff to better the tank on a regular hierarchical distribution which would give at different scales, by cascading effects, the same structure to the mix. Likely this model may be appropriate for the entire extent of the size distribution of the components, since the cement particles (and silica fume) correctly deflocculated, micrometric dimensions, to chippings sometimes several tens of millimeters. As part of this research, the aim is to give an illustration of the application of fractal analysis to characterize the granular concrete mixtures optimized for a so-called fractal dimension where different concretes were studying that we proved a fractal structure of their granular mixtures regardless of the method of formulation or the type of concrete.

Keywords : concrete formulation, fractal character, granular packing, method of formulation

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