

ANALOGUE SIMULATION BY DEM OF MATERIAL STRUCTURE FOR PROPERTY ESTIMATION OF CEMENTITIOUS MATERIALS

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ABSTRACT

Realistic simulation of particulate materials like concrete on meso- as well as micro-level is nowadays possible by fast developments in computer technology. This would be a more economic way than by physical experiments, which are more time-consuming, laborious and thus expensive. This concern the production of the aggregate structure or of the fresh binder material pocketed between aggregate grains. In the latter case, it should be followed by hydration to get the matured material. A subject of major relevance is porosimetry. This requires techniques of delineating the capillary pore network structure for the assessment of topological and geometric properties. By combining such features with hydraulic properties, a model could be designed for estimating transport properties of concrete. Influences of technological parameters on packing characteristics are of interest for optimum packing, strength and durability of cementitious composites. The paper will concentrate on packing problems and the resulting pore network structure. Some results will be presented for illustrative purposes.

Keywords

Concrete, aggregate, particle packing, DEM, hydration, pore network.