SUMMARY

In this dissertation, the concept of Gibbs Free Energy of concrete is first explained and experimental results of Gibbs Free Energy of concrete modified with three (3) commercial admixtures, one superplasticizer and silica fume in two different dosages are reported. This project takes Gibbs Free Energy in admixture-modified concrete as an important quantity governing permeability and durability of this concrete from a viewpoint of energy, which is one step further than the view of micro-pore-structure only.

A method for the determination of Gibbs Free Energy through measurement of pore size distribution is worked out. The pF value and the pore sizes are derivable one from the other over some of the range; pF value can be determined by the average pore diameter.

The Mercury Intrusion Porosimetry is employed as an experimental method to measure the pore size distribution. The investigation involves experiments on seven samples of concrete modified with admixtures, superplasticizer and silica fume as mentioned earlier.

Analysis is mainly based on the results of pore size distribution and the Gibbs Free Energy in pF value. It is found from the results that the values of Gibbs free energy in concrete is highly dependent on the average pore diameter of the concrete and the pore size distribution and hence is useful to study durability of admixture modified concrete.

The importance and usefulness of the concept of Gibbs Free Energy in concrete modified as above are studied. The feasibility of using Gibbs Free Energy in pF value as a fundamental parameter to indicate and compare the micro-pore structure of concrete and its durability are discussed.

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