

Long-Term Deformations of Concrete Structures

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Abstract : Drying is a phenomenon that accompanies the hardening of hydraulic materials. It can, if it is not prevented, lead to significant spontaneous dimensional variations, which the cracking is one of events. In this context, cracking promotes the transport of aggressive agents in the material, which can affect the durability of concrete structures. Drying shrinkage develops over a long period almost 30 years although most occurred during the first three years. Drying shrinkage stabilizes when the material is water balance with the external environment. The drying shrinkage of cementitious materials is due to the formation of capillary tensions in the pores of the material, which has the consequences of bringing the solid walls of each other. Knowledge of the shrinkage characteristics of concrete is a necessary starting point in the design of structures for crack control. Such knowledge will enable the designer to estimate the probable shrinkage movement in reinforced or prestressed concrete and the appropriate steps can be taken in design to accommodate this movement. This study is concerned the modelling of drying shrinkage of the hydraulic materials and the prediction of the rate of spontaneous deformations of hydraulic materials during hardening. The model developed takes in consideration the main factors affecting drying shrinkage. There was agreement between drying shrinkage predicted by the developed model and experimental results. In last we show that developed model describe the evolution of the drying shrinkage of high performances concretes correctly.

Keywords : drying, hydraulic concretes, shrinkage, modeling, prediction

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