

Modeling of Nonlinear Moisture Transport in Concrete according to Bažant-Najjar

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Abstract

Modeling of moisture transport in cementitious materials has many applications, ranging from predictions of drying shrinkage development and its ultimate value and drying creep of concrete to durability of materials and structures or health issues.

A material model based on the approach of Bažant and Najjar (Nonlinear water diffusion in nonsaturated concrete, *Materials and Structures*, 1972) has been implemented into the finite element framework OOFEM. The model provides quite accurate predictions of time development of moisture in concrete while its formulations remains simple enough for engineering practice. For these reasons the model has been recommended in a prestandard document fib Model Code 2010.

It has been found the numerical results presented in the original paper cannot be obtained with the values of parameters given in that paper. In this contribution, optimal values of the material parameters are recommended and the model is applied to other experiments reported in the literature. Accuracy of the fib Model Code parameter recommendation is also discussed. Attention is also paid to the influence of the boundary condition.