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Modeling basic creep of concrete since setting time

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1 **Modeling basic creep of concrete since setting time**

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7 **Abstract**

8 Modeling the early age evolution of concrete properties is necessary to predict the early age behaviour
9 of structures. In case of restrained shrinkage or application of prestress load [1], creep plays an
10 important role in the determination of the effective stress. The difficulty lies in the fact that the
11 modeling of creep must be based on experimental data at early age and this data must be obtained
12 automatically because the hardening process of the concrete takes place rapidly during the first hours
13 and also the first days. This paper presents a new methodology to model basic creep in compression
14 since setting. Two kinds of tests are used: classical loadings and repeated minute-scale-duration
15 loadings. The classical test is used to characterize the creep function for one age at loading and the
16 repeated minute-scale-duration loadings test is used to define two ageing factors for the creep
17 function. A new model based on the physical mechanisms and the two ageing factors is presented. A
18 comparison with the Model Code 2010 is done and an advanced way to consider ageing with the
19 Model Code 2010 is presented.

20 *Keywords: Concrete, very early age, basic creep, modeling*

21 **Introduction**

22 Nowadays, the construction phases of modern concrete structures (including high-rise buildings,
23 bridge piers, and storage tanks) are challenging due to their high performance requirements.

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