

Implementation and Validation of a Damage-Friction Constitutive Model for Concrete

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Abstract : Two constitutive models for concrete are available in ABAQUS/Explicit, the Brittle Cracking Model and the Concrete Damaged Plasticity Model, and their suitability and limitations are well known. The aim of the present paper is to implement a damage-friction concrete constitutive model and to evaluate the performance of this model by comparing the predicted response with experimental data. The constitutive formulation of this material model is reviewed. In order to have consistent results, the parameter identification and calibration for the model have been performed. Several numerical simulations are presented in this paper, whose results allow for validating the capability of the proposed model for reproducing the typical nonlinear performances of concrete structures under different monotonic and cyclic load conditions. The results of the evaluation will be used for recommendations concerning the application and further improvements of the investigated model.

Keywords : Abaqus, concrete, constitutive model, numerical simulation

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