General cracked-hinge model for simulation of low-cycle damage in cemented beams on soil - DTU Orbit (10/01/2019)

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The need for mechanistic constitutive models to evaluate the complex interaction between concrete crack propagation, geometry and soil foundation in concrete- and composite pavement systems has been recognized. Several models developed are either too complex or designed to solve relatively simple problems, e.g. limited to one type of load configuration or test set-up. In order to develop a general and mechanistic modeling framework for non-linear analysis of low-cycle damage in cemented materials, this paper presents a cracked-hinge model aimed at the analysis of the bending fracture of the cemented material. The model is based on the fracture mechanics concepts of the fictitious crack model. The proposed hinge is described in a general and consistent format, allowing for any type of stress-crack opening relationship and unloading-reloading formulation. The functionality of the proposed hinge model is compared to numerical- and experimental results. The proposed hinge shows good performance and seems promising for the description of low-cycle fracture behavior in cemented materials.

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