

Stress-based gradient-enhanced damage models with decreasing nonlocal interactions

Bram Vandoren* and Angelo Simone†

* Hasselt University, Faculty of Engineering Technology
Hasselt, Belgium
e-mail: bram.vandoren@uhasselt.be

† Delft University of Technology, Faculty of Civil Engineering and Geosciences
Delft, The Netherlands
e-mail: a.simone@tudelft.nl

ABSTRACT

Although integral and differential nonlocal damage models have proven to be effective regularisation techniques to overcome mesh-dependency of strain localisation, it has been shown that the use of a constant length scale parameter in these models will lead to an incorrect representation of failure mechanisms either by spurious damage growth [1] or by incorrect damage initiation and propagation [2]. In this contribution we therefore propose a set of anisotropic stress-based gradient-enhanced damage models, inspired by the stress-based integral nonlocal damage model by Girya et al. [3], in which the length scale parameter and thus the non-local interaction activity vanishes with decreasing stress levels. Through shear band and bending tests, the performance of the models with respect to damage initiation and evolution will be evaluated. Focus is placed on handling and avoiding numerical issues when the length scale parameter becomes too small with respect to the mesh size.

REFERENCES

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